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ORIGINAL COMMUNICATIONS.

THE NEWER IDEAS CONCERNING DIGITALIS.

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The studies of the action of digitalis which have been made within the last five years have led to changes in our conception of its effects almost as revolutionary as those which were caused by the investigations of Traube and of Brunton fifty years ago. There is no drug a knowledge of whose physiological action is more important for its clinical employment than digitalis. It has seemed to me, therefore, that it might be worth while to summarize the results of recent investigations of this subject.

The experiments of pharmacologists with digitalis up till the beginning of the present century, and even later, had been so harmonious that their conclusions seemed to be established beyond possibility of assault. There is, however, one error of technique which has been common to nearly all of these investigations, and that is the size of the dose which was employed. Pharmacologists have not yet fully recognized the importance of distinguishing between toxic and physiologic effects. Whole masses of our ideas concerning the therapeutic action of drugs are based upon experiments made with doses far in excess of those which could ever be employed in practical medicine.

I have been somewhat startled, in studying the subject from this view-point, by the quantities of the digitalis bodies which have been administered to the lower animals for the purpose of determining its physiological action. Doses equivalent to from one to two hundred minims of the tincture for a man, injected directly into a vein, have been almost universally employed. In their masterly paper which established the vasomotor stimulation of the digitalis series, Gottlieb and Magnus injected intravenously one milligramme of strophanthin or digitoxin per kilogramme body weight; this would be equivalent to about one and one-sixth grains for a man of one hundred and fifty pounds, or about two hundred times the official dose for strophanthin. This enormous discrepancy in dosage cannot be excused on the ground of lower susceptibility in the dog or cat, for Fraenkel showed that 0.08 mgm. of digitoxin per kilo body weight, injected hypodermically, was fatal to the cat on the tenth day, and that 0.04 mgm. produced a marked slowing of the pulse. It must not be imagined that the doses used by Gottlieb and Magnus are exceptionally large; I have quoted them as examples because of the reputation of the experimenters and the wide-spread recognition of their paper. The doses they administered are typical of what was universally employed at that time. It is not strange that pharmacologists have reached some erroneous conclusions concerning the therapeutic effects of digitalis.

The characteristic results which have been heretofore attributed to digitalis are: reduction of the pulse-rate through stimulation of the inhibitory mechanism, increase in the force of the contractions of the heart, and narrowing of the lumen of the blood-vessels by an action both directly upon the

unstriped muscle and upon the vasomotor centers in the medulla. Partly because of the increased vigor of the heart, but partly because of the vasomotor stimulation, the blood-pressure is elevated.

Recently a number of observers have reported with seeming surprise that in human beings digitalis does not increase the arterial tension. But this conclusion is after all not contradictory to the results of animal investigation. For instance, Hernando found that doses of 0.04 mgm. per kilo of strophanthin—this is only about ten times the quantity used clinically—produced marked slowing of the pulse in the rabbit, but did not cause an increase in blood-pressure. Similarly Jonnescu and Loewi found that half this quantity was sufficient to cause marked diuresis in the rabbit without any rise in arterial tension. It is apparent, therefore, that neither in the dumb animal nor in man is digitalis, in therapeutic dose, likely to produce any distinct increase in the blood-pressure.

Despite the fact, however, that the blood-pressure is not raised by medicinal doses of digitalis, it is probable that there is some slight effect upon the vasomotor system. The evidence in favor of this view is two-fold. In the first place Fraenkel found that if he abolished the slowing of the pulse by the administration of atropine, strophanthus caused in the normal man a marked increase in the arterial pressure. The second evidence in favor of a vasomotor action is found in the diuretic effects often produced. From the studies of Jonnescu and Loewi as well as of Joseph, it is highly probable that the diuretic action of the digitalis group is due to a relative dilatation of the blood-vessels in the kidney. Joseph has shown that this local vascular relaxation may occur simultaneously with a contraction of the arteries of the splanchnic area. It is therefore not improbable that the recurrence of diuresis is indicative of a change in the caliber of the vessels.

The most constant, and the earliest apparent, effect produced by relatively small doses of digitalis is slowing of the pulse. While many have believed that the drug produces some change in the heart muscle which is in part responsible for the reduction of the pulse-rate, the present evidence seems to me to indicate very strongly that the slowing is of purely inhibitory origin, except after very large doses. I know of no convincing proof that in normal man digitalis in therapeutic doses has any distinct action upon the heart other than to excite the inhibitory mechanism. Nearly all of the abnormal varieties of heart-beat which have been recently described as evidence of the action of digitalis upon the cardiac muscle may be produced by stimulation of the vagus nerve. Thus, for instance, Gaskell says that one of the most striking effects of vagus stimulation is depression of conductivity, "especially at the two natural blocking points, the sino-auricular and the auriculo-ventricular junctions." Cushny, Morris and Silberberg reach the conclusion that most of the cases of heart block and sinus arrhythmia following the therapeutic use of digitalis are due to inhibitory stimulation, although in some cases they believe the arrhythmia to be the result of an action upon the cardiac muscle. Even if we grant that their evidence is sufficient to justify the latter exceptions, it must be remembered that they were dealing with diseased hearts, and one must be very careful in applying facts derived from studies upon the normal animal to diseased conditions, and *vice versa*.

Some therapeutic neophytes in their youthful ardor have been led by the interesting publications of Mackenzie and his followers to promulgate extreme views concerning the effects of digitalis, the justification of which I have sought in vain. It has been suggested, for instance, that after all digitalis is but an uncertain stimulant to the vagus mechanism. True it is that in only seven out of twenty-one patients with "normal rhythm" reported by Mackenzie was the rate of the heart-beat distinctly reduced by digitalis. Although those observations were made upon patients with normal rhythm it certainly cannot be main-

tained that their hearts were normal. They were all, excepting a couple of febrile patients, cases of valvular lesions with unknown degrees of change in the heart muscle. While such evidence may be of importance in guiding us in the application of digitalis for the treatment of disease, it is of very little significance as to the effects of digitalis upon the healthy man or animal.

That in the normal man, as in the normal animal, digitalis is a powerful inhibitory stimulant is indicated by the studies of Fraenkel upon individuals with apparently normal circulatory apparatus. The following table shows the average pulse-rate and blood-pressure as reported by him:

	Pulse rate.	Systolic pressure.	Diastolic pressure.
Normal	70	140	90
Atropine	115	140	95
Strophanthus	55	135	80
Atropine after strophanthus	110	165	90

It is interesting to note also that in this series Fraenkel was unable to demonstrate any evidence of the increased muscular tone which has been supposed to be a characteristic effect of digitalis. He found that in none of the cases he examined was either systolic or diastolic pressure in the arteries increased by strophanthus, but that in a large number while the systolic pressure remained the same the diastolic pressure was lessened. This is precisely the result which would be expected from an inhibitory stimulant, for excitation of the vagus not only reduces the rate of contraction but also the tonus of the heart muscle. That there was, however, some effect upon the heart muscle is suggested by the facts that after the inhibitory effects of strophanthus were removed by atropine the pulse-rate was not quite as rapid as after atropine alone, and the pulse-pressure was greater than normal.

The action of small doses of digitalis upon the normal circulation may be summed up briefly as a stimulation of the cardio-inhibitory mechanism with probably a slight increase of vasomotor tone, but not sufficient to cause any rise in the blood-pressure. The increased vigor of contraction and muscle tone due to a direct action upon the heart muscle, while perhaps manifestations of the action of therapeutic doses, are later phenomena than the retardation of pulse-rate.

The effects of digitalis in disease are often very different from those produced in health. Among the first of the morbid factors which modify the reaction to this drug may be mentioned fever. It has long been known that the action of digitalis is much less marked when the body temperature is elevated, and as far back as 1884 Brunton and Cash showed that in the cat when the temperature is elevated to 40° C. (104° F.) neither digitalis nor electrical stimulation of the pneumogastric nerve was capable of slowing the pulse. Moorehouse, however, contends that the increase in the pulse-rate caused by fever is not due to paralysis of inhibition but to stimulation of the accelerator centers. It is of course possible to conceive that there might be a stimulation of the accelerator centers so powerful that although the inhibitory mechanism retained its normal function it would still be powerless to slow the pulse. Through whatever mechanism the fever may act the increase in the pulse-rate is the direct result of the overheating of the blood, for Brunton and Cash found that when digitalis was given in full dose during the period of pyrexia, although there was no change in the pulse-rate, if for any reason the temperature of the animal fell rapidly an extreme degree of slowing occurred. This is in entire harmony with clinical experience. In infectious fevers, however, it is probable that the toxins produce some myocardial degeneration which also adds to the recalcitrance of the heart to inhibition.

Many of our most cherished theories concerning chronic heart disease have been completely exploded by the pioneer revelations of Mackenzie and of Cushny as to the causes of rupture of compensation. As is well known, this group of cardiologists have shown that in many cases of a severe heart failure the auricle ceases to contract coördinately, passing into a condition

known as fibrillation, in which each muscle fiber contracts without any relation to its fellows. This auricular chaos means practically a paralysis of that chamber, and is accompanied by an absolute irregularity of the ventricular rhythm and commonly an increase in its rate. Mackenzie differentiates sharply between the action of digitalis in those cases in which the auricle is fibrillating and those in which it is beating coördinately. The most marked effects are seen in the first group, but Mackenzie has never been guilty of the absurdity of some of his ultraenthusiastic followers who claim that digitalis is a specific in all cases of auricular fibrillation, but useless in all other forms of chronic heart disease, and that the fact that digitalis exercises a beneficial influence is of itself evidence that the case is one of auricular fibrillation. He definitely states that certain cases of this disorder are not apparently benefited by digitalis nor any of its congeners, and in a considerable proportion of his cases of valvular lesions, with normal rhythm, decided improvement followed the exhibition of the drug.

In cases of auricular fibrillation digitalis shows in full degree its action upon the pneumogastric nerve. Indeed, I believe it is the common impression that it causes more slowing of the pulse in this condition than it does in healthy hearts, but it seems to me somewhat hazardous to conclude from the present evidence that the action of digitalis is essentially different. It is true that the percentage fall in pulse-rate in these cases is frequently much larger than in the normal individual, but it must be noted that these hearts were beating with extraordinary rapidity before the administration of the drug. Thus in fourteen cases reported by Mackenzie the average pulse-rate before the exhibition of digitalis was about 102 per minute, and afterwards 60; while in the series of normal hearts studied by Fraenkel the pulse was 70 before and 55 after the exhibition of the drug. Moreover, in Fraenkel's studies much smaller doses were used than those administered by Mackenzie. It is important to note that the lowest pulse-rate after the digitalis is not essentially different in normal or fibrillating hearts, and this after all is the real measure of the degree of inhibition.

On the other hand in chronic endocarditis with normal rhythm the action of digitalis on inhibition is often less potent than in the healthy heart. For example, in twenty-one such cases reported by Mackenzie the average pulse-rate after digitalis was scarcely less than 80 per minute, and this despite the fact that the drug was given to the full limit of tolerance. In only six of these patients was the pulse-rate reduced below 65, and in five of these it produced either heart-block or sinus irregularity.

From our present data it is impossible to draw positive conclusions as to the mechanism of the slowing of the ventricular rate in cases of auricular fibrillation. Cushny, and since him a number of others, have shown that atropine in most cases will partially abolish the digitalis slowing, but not completely so. He is inclined to the opinion that the effect upon the cardioinhibitory nerves plays no part in the beneficial influence on this group of cases. This view, however, is hard to reconcile with the fact that no benefit was obtained from helleborein, an alkaloid the effects of which seem to be entirely similar to those of digitalis and strophanthus, except that it has practically no influence on the vagus.

It may be remarked in this connection that neither in the healthy hearts as reported by Fraenkel, nor in the cases of endocarditis with normal rhythm studied by Cushny, did atropine completely overcome the retardation produced by digitalis.

It is very commonly taught that the slowing of the pulse in cases of auricular fibrillation is due to a lessening of conductivity across the auriculo-ventricular bundle through a direct action upon the cardiac muscle, but Cushny rejects this explanation on the ground that there is no proof that digitalis diminishes the conducting power of the bundle of His, save through its action upon the inhibitory nerve. He is inclined

to attribute the slowing of the beat in these cases to a diminution of ventricular irritability, the result of better nutrition. This view finds a certain collateral support in the observations of Silberberg and of Talley, that in those cases in which the digitalis slowing is abolished by atropine—that is, in which it is due chiefly to inhibition—the outlook for improvement is less promising than where the slowing is the result of a muscular change.

There has been one tendency manifested by the modern school of cardiologists against which I believe a word of protest should be entered, and that is to give digitalis always in large doses until marked evidences of toxic effects are produced, such as nausea or arrhythmia. I have always believed and taught that with digitalis, as with any other potent drug, one should give enough to accomplish the desired result, but I am convinced that there are many cases which might be benefited by small doses in which these enormous quantities may prove actually harmful. Therapeutic boldness is an important medical virtue, but rashness is always a fault; it is as grave an error to habitually overdose our patients as it is to underdose them.

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WHEN AND HOW TO USE THE OBSTETRIC FORCEPS.

BY DANIEL LONGAKER, M.D., PHILADELPHIA.

In order to clarify our ideas it will be a good plan to speak, at the outset, of some conditions under which failure to attain an ideal result too often occurs. The "when" will be much more clearly perceived if we have definite conceptions of "when not" to act.

A few concrete examples will illustrate and at the same time emphasize this point. One of my early patients, having lost her first child at birth, came under my care in all of her subsequent confinements. She was a short, fat woman of the laboring class, and her labors were hard, but mostly ended by her own powers. Her babies grew larger and her abdomen more pendulous with each succeeding gestation. Finally, the seventh child, a boy, grown to larger size than any of the rest, became impacted. Her labor was obstructed. Her pains were violently expulsive. Alone, I did a median forceps delivery. There was little, if any, evidence of injury from the pressure of the forceps blade, and after about thirty minutes of work the infant breathed normally. Now, growing out of his teens, he continues a dependent, a case of hopeless cerebral palsy from birth injury. In commenting on this case I take direct issue with the neurologists. Very recently the opinion was expressed to me in private conversation that cerebral birth injuries resulted more frequently from failure to make timely use of the forceps than from injury directly due to their use. One hears the same views expressed in discussions of this subject. I

am convinced it is erroneous, my own opinion being that where one injury results from delay there will be ten from ill-timed, ill-judged interference. However this may be, the case is introduced for another more definite purpose, and that is to direct attention to the frequency of post-maturity, overgrowth of the child, and firm ossification of the cranial bones. The head has grown so large and hard that molding occurs imperfectly, and the woman whose pelvis is on the border-line of narrowness, indicated by a history of still-birth, goes into labor with a degree of obstruction dangerous to herself and child. Every case in which there is a history of still-birth ought to be the subject of especial study and repeated examination in the later months and weeks of gestation. It goes without saying that the rule ought to be invariable to estimate possible mechanical difficulties *before* and not after the onset of labor. The induction of labor at the thirty-sixth, thirty-seventh, thirty-eighth, or even the fortieth week of gestation would have put this dependent into the class of social assets. Whenever there is post-maturity, an overgrown baby, and an ossified head, the forceps may not be the remedy.

The next case belongs to the same class, although the attempted forceps operation ended disastrously in a different manner. The patient was twenty-six. Her first gestation ended in a miscarriage; the second was a delivery at or near term, the baby dying shortly afterward. In this labor she was under the care of Dr. J. W. West. I believe she was then delivered instrumentally. In her third gestation she engaged the services of a gentleman of the old school (twenty-five years ago), a man of extensive obstetrical experience through a long professional life, who had never applied the forceps. His early memory took him back to the days of Meigs, Wallace, and the older Hodge—to the time of gladiatorial contest when the big fellows fought and the little ones looked on and admired and became partisans, and obstructionists to the cause of truth! When I first saw the patient she had been in labor many hours, the amniotic fluid drained off, the head still within the dilated cervix, the anterior fontanelle toward the right acetabulum. A contraction ring could be felt. Forceps were applied to the non-rotated posterior occiput; and strong, but not very effectual, traction was made. Presently there occurred an audible snap, the cause of which was not clear. Traction was repeated and brought away a part of the instrument; another fragment fell on the floor, while the distal part of the blade remained within the uterus and out of reach. It, with the living baby, was delivered by the Cæsarian operation. The child thrived; but the mother died of peritonitis at the end of forty hours. The forceps, in an unrotated posterior occipital position with an impacted head and a patient exhausted by hours of ineffectual second-stage pains, should be entirely ruled out. This was emphatically a case of "when not" to use them.

A far larger class is one with superficial points of similarity, but in reality very different. I refer to cases of slight relative disproportion, best illustrated by an example of a head a little too large to engage easily, but not too large or too hard to do so under the influence of uterine action and the consequent process of molding. It must never for a moment be forgotten that a successful labor depends on far more than the relation of head measurements to pelvic measurements. The vital quality of muscular action and conservation of the amniotic fluid, and often of its timely drainage, have a large influence on the outcome. While we cannot always gauge just how much efficient work a particular individual will do, a wise conservation of neuromuscular energy in a long first stage will enable us to count on an active and efficient second stage. Thus the natural powers will overcome relative disproportion to a remarkable degree. This leads me to say that the use of forceps—simple forceps, or axis traction, or sericeps, or the early attempts of Frey to devise an instrument to be applied so as to exert pres-

sure in the conjugate or anteroposterior direction, all are absolute failures. One may not hope to overcome bony obstructions by their use. The natural forces of the woman will crowd a head apparently much too large down into reach very frequently and very safely. The forceps, even in expert hands, will not; it is a pure tractor, not a compressor, to be used only after the obstruction, if such exists, has been overcome.

The importance of this negative view of our subject and of correct judgment "when not to use" is based entirely on the uniformly successful outcome of the modern Cæsarian operation, when done under favorable conditions. The problem to-day is not the problem of twenty-five years ago. When Sanger devised his method, and Leopold of Dresden startled the medical world with his series of 25 successful cases, time was marked and a new era inaugurated. Contrast with this a century of obstetric surgery in the hospitals of Paris, with not a single successful case. Do not forget that the experiences of England, Scotland, Wales, and Ireland were not much better, and that here, in the States, the bulls, according to the late Robert P. Harris, did better work than the doctors. Then you begin to have an appreciation of what has been done. With facilities for rapid transportation everywhere available, there is no excuse for brutal antediluvian work to-day. Indeed, general surgery is becoming so aggressive that it behooves the obstetrician to have a care lest he and the forceps be relegated to limbo.

Nevertheless, there remain indications for positive action in spite of the plain contraindications already detailed. When inertia occurs in the second stage, perhaps after pituitary extract, strychnine, quinine, and what not have been given, and the head is well down in the pelvis—perhaps at the inferior strait—when it ceases to advance with each pain, when it ceases to recede with each intermission, then it is useless to wait, and only harm will result from such delay. Moreover, conditions may arise under which speedy delivery becomes imperative—*e.g.*, eclampsia, abruption of the placenta, so-called accidental hemorrhage, placenta previa, grave pulmonary or cardiac disease. It is not necessary to illustrate each one of these complications; their emergency will, as a rule, give timely warning. And early use of the forceps may be one of the most conservative life-saving measures in our entire armamentarium. Thus, it is evident, I do not rule out entirely the median and the high forceps operation. Under appropriate conditions it is not only sanctioned, but urged.

Another indication for which one should ever be on the lookout is failure of fetal heart action. When an ascertained rate of pulsation becomes much increased in rapidity, or irregular, or intermittent, the baby's life may often be saved by prompt action. This leads me to say that the forceps ought to be ready for use in every case, and the position and surroundings of every patient such that, should the necessity arise, an immediate safe application may be made. This advice I consider timely, especially since the use of pituitary extract has become common practice. Another condition which I believe not infrequently demands equally prompt action is partial, premature separation of the placenta, membranes remaining intact until the expulsive stage is well advanced. In some of these cases there is open hemorrhage, or it may be concealed. Not so long ago a woman lost her life in a maternity hospital in this city because the diagnosis of abruptio placentæ was missed. If the possibility of this accident is remembered (and of the lesser degrees) it will be recognized, and fetal life as well as maternal life be conserved. Therefore boil and have ready your forceps in a sterilizer—one hundred times—even though you really need them but once, or not even once, in the whole series.

I will repeat, in concluding the first part of the subject, under these definite indications, the forceps may be used on a presenting head when there is no disproportion, or after previously existing dispropor-

tion has been overcome, and after the soft parts have been properly prepared. Manifestly, some of these indications are not only permissive but mandatory.

May the forceps be used on a presenting breech? I have done so successfully, and I have met disaster. Years ago, in the days of Henry F. Formad as coroner's physician, I was summoned to an inquest through what I had supposed was a successful forceps delivery. The autopsy disclosed a rupture of the uterus from which the woman died.

Enough of the "When" and the "When not." Let us proceed to our second division, the "How." Wise judgment in proper selection of cases is the first step in the direction of attaining a passable if not a brilliant result. Shall the operation be done under anesthesia? If so, what shall be the anesthetic? Occasionally an urgent call is coupled with the advice that the patient is already under ether. While there is no particular objection to this drug, I do want to enter here an emphatic protest against its excessive use. Of late so much has been said about the dangers of scopolamine and morphine that it seems a little strange one should hear neither caution nor protest against the equally great danger to infantile life of full ether narcosis. Ether, if used at all, should not be pushed beyond the degree of seminarcosis—a stage of unconsciousness very similar to the recently much discussed "twilight sleep." It is perperfectly feasible to introduce the blades with the patient awake. The maneuver can be carried out without a particle of pain. I remember well the directions of the late Albert H. Smith, to pass the blades, then lock, and finally compress the handles and note if this act causes pain, in order to be quite certain that none of the maternal tissues are in the grasp of the instrument. The left blade is passed, and then the right, in its corresponding hand, toward the corresponding side of the pelvis—lightly held like a pen and not like a sledge-hammer. The endeavor is to make the application to the sides of the head, the position of the occiput having been previously ascertained. By boiling a few towels with your instruments, by padding a kitchen table, by having a trained nurse to assist you in every case, you can convert the humblest home into a place for safe delivery, instrumental or natural. Even the ordinary bed, properly prepared, the patient lying across it, draped with her boiled towels, is not prohibitory of such gentle work as that attending nine out of ten legitimate forceps operations.

The endeavor to make a cephalic application should be a gentle one. Juggling the head not infrequently will bring a loop of the umbilical cord within the grasp of the distal end of one blade and the head, usually with fatal result. Traction is made gently, avoiding compression, and intermittently and coincidentally with the pains. Watch the head normally advancing with the accession of each pain and observe its recession as the pain ceases, and imitate the process. For final enucleation of the head, it may be well to remove the instrument. Frequently what seems a proper degree of traction will fail. Very often, indeed, as a rule, a reapplication will be successful, if the case be at all appropriate for forceps delivery.

In conclusion, and at the risk of some repetition: The obstetric forceps is a pure tractor, not a compressor, to be applied in the gentlest manner—traction to be made intermittently in imitation of the advance of the head under the natural propulsive forces and always moderately; the attempt to overcome disproportion by traction when the head is high up is more than questionable; the high forceps in the absence of disproportion is a feasible operation. As the indications for the forceps have been narrowed, the need for the axis traction principle has passed. Such a degree of disproportion as cannot be safely overcome by time—the test of labor—at once relegates the case into a class in which forceps should not be attempted. Antepartum examinations and the finer judg-

ment developed by constant observation will enable one to avoid falling into the error of attempting the impossible. The ideal of an uninjured, healthy, thriving infant, and an unscarred mother passing through her puerperium without morbidity, must ever be before our eyes. Time, especially under the influence of proper analgesia, amnesia—the "twilight sleep," if you will—as I have shown in a recent contribution to International Clinics, is frequently the one factor in the attainment of this object!

SALVARSAN AND NEOSALVARSAN.

BY FRANK R. STARKEY, M.D., PHILADELPHIA.

There is perhaps no other vocation that requires more breadth of mind and sound and deliberate judgment than the practice of medicine. Yet, strange as it may seem, medicine has scarcely ever been free from fads, and stranger still these fads are not promoted by the rank and file only, but by the so-called leaders in medical thought. One after another they are taken up by the internist or the surgeon and ridden with zeal, until finally their fallaciousness becomes apparent. But, luckily, the profession always comes through these periods unscathed and grows stronger and better than ever. Unfortunately scarcely as much can be said of the patient. The surgeons are now just emerging from such a fad. I refer to the crop of operations that followed Lane's work in connection with intestinal stasis. But the internist is still in the depths of another, namely, the use of salvarsan and neosalvarsan.

Seldom in the history of medicine has a therapeutic agent received such widespread publicity, both in the medical and lay press, as salvarsan, and seldom has a remedy been received with more widely opened arms. Nor is this surprising, for it was claimed that it would cure syphilis at one grand stroke, and it was an emanation from the brain of a distinguished scientist, a man with the imagination of a poet, the indefatigable persistence of a scientist and a reputation for past achievements. The contemplation of the possibility of eradicating syphilis from the earth, with all that that implies, was justification enough for the unhesitating acceptance of the claims of Ehrlich and his colleagues. A cure of this kind has been the dream of the medical profession since the fifteenth century, whence our first definite knowledge of the disease dates.

Salvarsan is the result of a long series of experiments, by Ehrlich, said to be six hundred and six in number, in an endeavor to produce a sterilizant magna which would, at one grand blow, destroy the syphilitic infection without harming its host. The care and zeal, of which this is the outcome, are evidenced by the large number of experiments which led up to it. The care with which it was launched upon the medical profession was scarcely less remarkable. After first trying it out in his home city and country, men of prominence, leaders in their profession, were chosen in various medical centers of the world and delegated as representatives of Ehrlich in this work. Salvarsan is manufactured by the Farbwerke Hoechst Company, Berlin, Germany, and is described by them as diamidodioxyarsenobenzol, and marketed at a price that is almost prohibitive. It is said to contain 31 per cent of arsenic. The usual dose ranges from .1 to .9 gm.; a full dose therefore represents about 13½ grains of arsenic.

The disappointment which naturally followed the failure of salvarsan to justify the claims that were first made for it was responsible for further investigations upon the part of Ehrlich, and by continuing the series of experiments from 606 to 914, neosalvarsan was finally arrived at. It is said to contain 21 per cent of arsenic. This substance has the advantage of being more easily prepared for administration and less

irritating than salvarsan, but the consensus of opinion seems to be that it is less efficient than salvarsan, and the tendency of syphilologists has been to return to the original preparation. The chemical formulæ of salvarsan and neosalvarsan are given, but their production is forbidden under the protection of patents and trade-marks. They are therefore true patent medicines. Notwithstanding this our most ethical medical journals have received their advertisements. If an American scientist or manufacturing pharmacist attempted to foist upon the profession any preparation under such circumstances the profession and the medical periodicals would be scandalized. Since it bears the label "Made in Germany," we simply call it another example of German efficiency. It has been administered intramuscularly, intravenously, intraspinally, intracranially, and more recently it has been applied topically.

The word cure, which has been taboo so long by the medical profession, has been hauled out and polished up and is constantly displayed in the exploitation of salvarsan, although there has not been a single case of syphilis or any of its nervous manifestations recorded in which there has been scientific evidence of a cure by the use of this drug. The conservative physician should do his utmost to overcome the belief that has become popular among the laity to the effect that one or more doses produce cure or immunity. This belief is responsible for a large amount of harm, due to neglect of treatment by the older methods. In the primary lesions and ulcerated syphilitic manifestations very brilliant results have been achieved with salvarsan, but these results tend to rather cloud the atmosphere and lead the physician and his patient to believe a cure has been obtained when such is not the case. Those who have followed their cases for sufficient length of time have noted the frequency with which relapses occur. G. Verrotti[1] has pointed this out and maintains that the relapses, especially in the secondary stage, are more severe than they were before the treatment with salvarsan commenced. The conclusion is that while locally a cure has been effected, there has been no attenuation of the vitality of the spirochæta.

In searching the voluminous literature on salvarsan there are several things that stand out rather boldly. One is the very evident desire on the part of some members of the medical profession to increase the popularity of this agent by reporting every case that they treated. The literature is replete with reports of very small groups of cases, ranging from one or two to twenty, and they are usually made so soon after treatment that no scientific deductions can be drawn. Another conspicuous feature of this literature is the manner in which physicians reporting cases attribute *all* beneficial results obtained to salvarsan or neosalvarsan exclusively, although they almost invariably use the older and saner methods of intensive mercury and iodine treatment in conjunction with their salvarsan administration. A strong desire to minimize the evil effects of salvarsan is also very evident in the literature. Another feature is the wide variety of conditions in which it is used, ranging from acute syphilis, through the various secondary and tertiary syphilitic conditions, to other affections in which there is no possibility of syphilitic connection. This tendency to rush into print with this immature data is all the more astonishing in view of our present attitude of medical nihilism and style of belittling drug treatment, which has placed the word dope on the lips of nearly every one both in and out of the profession and has caused the ascendency of the various non-medical "pathies."

The administration of salvarsan is fraught with considerable difficulty owing to its instability and great susceptibility to change when exposed to the atmosphere. It must be prepared for administration with great care and its alkalinity carefully assured. The methods of administration have undergone considerable change. At first it was given by deep intramuscular injection, but this was found to produce violent local irritation, tumefaction, and

pain of such intensity as to necessitate the patient remaining in bed for several days. To overcome this unpleasantness other methods were employed, and finally intravenous injection was decided upon. This may seem strange in view of the extremely irritating nature of the substance even when highly diluted. Nevertheless, this is the method of choice now employed in ordinary cases. With still more daring those desiring to employ it in the treatment of tabes and paresis, in which diseases it was found to be ineffective when given by intramuscular and intravenous injection, have had the courage to introduce it either in aqueous solution or in the form of serosalvarsan into the spinal canal and even intracranially. When we again think of its extremely irritating nature this is almost astounding, and it is not surprising to note the train of untoward results that have ensued therefrom, ranging from terrific pain through various degrees of paralysis to death. Wechselmann and Marienaesco first conceived the idea of introducing antisyphilitic remedial agents into the spinal canal. They worked independently. Then Swift and Ellis, of the Rockefeller Institute, took up the work, and their experiments attracted wide-spread attention. Although the experiments of Swift and Ellis on monkeys clearly showed the extreme danger of the method, it still survives. In view of the rather large number of unfavorable results that follow subarachnoid injections of serosalvarsan, it is somewhat astonishing to see such expressions as the following made by a competent observer: "We are at least attacking the disease from a new angle without hazard to the patient." Swift and Ellis specifically declared that they did not present their method as a substitute but rather as an adjuvant to the generally accepted forms of treatment, but their followers have lost sight of this fact and have lauded it as the only curative agent in the treatment of paresis and tabes. Search of the literature reveals three thousand and thirty-three cases treated by salvarsan, exclusive of twenty-four hundred and thirty cases of yaws reported by Wm. H. Best,[2] in which no details are given, in which there were three hundred and thirty deaths, or about 11 per cent mortality.

Evidence of the strong desire of the profession to employ this remedy is shown by the list of diseases in which it has been used, namely, anemia, nutritional disturbances, tropic ulcer, relapsing fever, heart involvement in syphilis, scarlet fever, mental deficiency, cerebrospinal syphilis, tabes dorsalis, gummatous syphilis of nose, throat, pharynx, larynx, skull, tibia, penis, sternum, joints, syphilitic osteomyelitis or periostitis, acute and active pulmonary tuberculosis, amebic dysentery, anthrax, bilharziasis, carcinoma, chancroid, Sydenham's chorea, dermatitis herpetiformis, erythema multiforme, filariasis, Hodgkin's disease, keratosis follicularis, leprosy, lichen planus, lupus vulgaris, mycosis fungoides, malaria, pemphigus, pellagra, pityriasis rubra, psoriasis, rhinoscleroma, scurvy, sarcoma, trichinosis, trypanosomiasis, verrucæ planæ, variola vera, Vincent's angina, phlyctenular keratitis, and papillary iritis. While the statements of Flexner[3] in his article on poliomyelitis have been used legitimately to substantiate the rationality of administering salvarsan intraspinally, it can with equal fairness be used in pointing out the danger of general infection of the nervous system by this route. Although the blood by its highly organized autoprotective facilities may be able to neutralize or destroy infection or toxic substances in considerable amounts, no such autoprotective capacity can be attributed to the cerebrospinal fluid. On the other hand it is an ideal culture medium. The avidity with which the physicians have persisted in the use of salvarsan, the hazards that they have taken in its administration, and their anxiety to show good results from its use are astonishing. A striking feature of the report of cases is that they do not seem to have been followed for a sufficient length of time to determine what has been done in the way of benefits or injuries. In reviewing the literature on this subject one is

impressed with the lack of definiteness in compiling statistics. This makes it absolutely impossible to arrive at any rational idea of the percentage of patients benefited or the degree of benefit after treatment by this method. The tendency of the workers with salvarsan is to try to show brilliant results obtained in a short period of time, to produce cures in a few weeks or months. This is especially deplorable, as it gives the patient a false sense of security which may ultimately result in reaping a big crop of cases of nervous and other late forms of syphilis.

No attempt has been made to use this drug on the basis of the relation of the physiologic action of salvarsan to the etiology and pathology of the disease treated. The remarks made by Dr. Graves[3] in discussing Drs. Pillsbury, Hammes and Riggs' papers at Atlantic City, to the effect that the medical profession will reap a harvest of late manifestations of syphilis of the nervous system such as tabes and paresis due to this indiscriminate use of salvarsan, I believe to be entirely rational and a prophecy that will be fulfilled. In urging the necessity of following up the so-called cured cases of syphilis after the use of salvarsan and neosalvarsan, B. C. Corbus[4] prophesies that our insane hospitals in the future will contain a larger percentage of cases of involvement of the central nervous system than they do to-day, and states that since October, 1913, he has performed lumbar puncture with spinal fluid examinations on as many patients biologically cured as he could induce to return for examination. Of these so-called cured cases, excluding syphilis with cerebrospinal manifestations, he found spinal fluid involvement in 18.3 per cent. Many patients, resting securely in the faith of the persisting negative Wassermann and good health, refused to submit to this procedure.

Among the complications following salvarsan are: chills, rise in temperature, pain, swelling, somnolence, vomiting, headaches, diarrhea, suppression of urine, incontinence of both urine and feces, optic atrophy with total loss of vision, impairment of or total loss of hearing, epileptiform seizures, meningitis, either aseptic, chemical, or infectious, intraspinal hemorrhage, dermatitis hyperkeratosis, gangrene of penis and scrotum, and circulatory collapse.

There seems to have been no definite effort made to trace salvarsan from the time of its administration until elimination. The immediate effect is to produce an irritation of the intima of the blood-vessels into which it is introduced. When the injection is given into the subarachnoid space hyperemia and local swelling follow. The burden of elimination is forced upon the kidneys principally and is responsible for nephritic hyperemia. Before we can consider this work on a scientific basis we must have some accurate data upon the effect of these huge doses of arsenic upon the blood-vessels, liver, and kidneys, and also the results of this irritating substance upon the tissues in the subarachnoid space. It has been shown by extensive experimentation that the choroid plexus filters out irritating and poisonous substances from the blood, thus preventing them from entering the cerebrospinal fluid, and by this action of the ependymal cells of the choroid plexus, salvarsan, when given intravenously, does not enter the cerebrospinal fluid. However, it has been found under intensive treatment with huge doses that it was possible to break down this natural barrier, and small quantities of salvarsan have been detected in the cerebrospinal fluid after such treatment. The question that naturally arises is: If the function of the choroid plexus is thus impaired will this impairment be temporary only, or will it be permament; and further, if the efficiency of the choroid plexus is so reduced as to permit salvarsan, even in small quantities, to enter the cerebrospinal fluid, will it not cease to be a barrier to other poisons and thus rob the cerebrospinal axis of one of its greatest protections against infection? It has been claimed that it was not the quantity of salvarsan that destroyed the spirochætæ, but the mere presence of salvarsan. This would

seem to eliminate the necessity of further introduction by intraspinal injection. It has been demonstrated that within one hour from the time of intravenous administration of salvarsan, little or none of it can be found in the blood. It is probable that it is principally stored by the liver and suprarenal glands, as Irokawa[5] reports it can be demonstrated in the urine for three weeks after administration.

Wechselmann believes that a certain proportion of fatalities following the administration of salvarsan are due to the inability of the kidneys to eliminate the poison. Adler has shown the frequency of the occurrence of periarteritis in syphilis. This has been verified by many other observers. The blood-vessels of the kidneys are among those involved, and it would seem that they are already taxed to their limit to perform their ordinary function without adding additional toxic substances for elimination. There is danger of the doses overlapping and the patient receiving an accumulative effect. As has been pointed out, it takes at least three weeks for the arsenic to be completely eliminated from the system. If the doses are given at more frequent intervals one can readily see how a piling up of arsenic in the system can take place.

After a careful study and their own summary of the seven cases of paresis reported by J. A. Cutting and C. W. Mack,[6] we must conclude that there was no definite gain resulting from the administration of salvarsanized serum, and we may add that even though these cases have been considered hopeless the results do not justify the risk. It is also very apparent that not sufficient time has elapsed to justify even the very modest claims of improvement which they make. These same authors in reporting a series of twenty-two cases state that if two injections are given in the same vein it was found difficult or impossible to give a third treatment in the same vessel. The vein became hard and cord-like and its caliber became much smaller. All of the cases of syphilis reported as having been treated by salvarsan or neosalvarsan received at the same time more or less concentrative treatment by the older methods —*i.e.*, mercury and iodides. If the dose of salvarsan administered intravenously becomes thoroughly mixed with the blood, each 12 Cc. of serum, the amount which is advised by Swift and Ellis, would contain only 1/250 of the original dose or 0.00004 to 0.0001 gm., providing it was all present in the blood at the time the serum was taken from the vein. But in view of our knowledge of the rapid elimination of salvarsan we know that but a very small fragment of the original dose is contained in the blood after the lapse of one hour. In fact, many observers claim that by this time no salvarsan can be detected in the blood, and in the light of our present knowledge of serotherapy and antibodies why would it not be more reasonable to suppose that any benefits that do accrue from intraspinal injection of serosalvarsan are due rather to the antitoxic elements in the blood which nature has elaborated to combat the disease, rather than this small unknown quantity of salvarsan? We have yet to reckon the ill effects that follow the introduction of this irritating substance into the spinal canal, as we have no records of histological findings in the blood-vessels, spinal membranes, tissues of the cerebrospinal axis, and the kidneys.

Now that the entire medical fraternity has accepted the biological tests of Wassermann and the others referring to the blood and spinal fluid, the wave of confidence which caused us to believe that we had finally reached a stage when we could speak of a positive cure in syphilis is beginning to recede, since, after a lapse of eighteen months or two years or more, positive Wassermann reactions have been found to recur in both blood and cerebrospinal fluid. The laboratory findings are apt to be contradictory. We may find a positive Wassermann in the blood and a negative Wassermann in the spinal fluid, or the reverse may obtain. The literature is replete with instances where the Wassermann blood and spinal fluid and other laboratory findings

have become negative, yet the patient showed no clinical improvement. It does not seem that the improvement in the laboratory findings alone justifies the terrific temporary disturbances or the risk of permanent injury that follow this work. The confusing nature of the results obtained by the Ravaut method is well illustrated in the cases reported by U. G. Wile.[7] In one of his cases there was accentuation of the lightning pains and increase in bladder symptoms after the first injection. Improvement was noted after the second injection, but the condition was aggravated after the third injection. Notwithstanding this progression the spinal fluid became almost normal. A prominent feature in the report of Wile's cases is the initial improvement followed by relapse after a definite period.

The rationale and real significance of the Wassermann and all of the laboratory tests for syphilis are still distinctly mysterious and their true meaning not fully known. The presence of lipoid bodies such as cholesterin produces a negative Wassermann in the face of known active syphilitic processes. Inasmuch as the Wassermann reaction is not a test for the presence of the syphilitic infection, that is, the actual spirochæta, but rather *an index of the resistance* of the body to such infection, the fact of its disappearance does not necessarily prove that the infection has been removed, but may simply indicate that the resistance of the individual has been destroyed and he is therefore no longer able to produce antibodies. The chief points of improvement following the administration of serosalvarsan intraspinally have been in the laboratory findings, but it must not be forgotten that these tests are a rather poor index to the clinical condition. For in the face of absolutely negative Wassermann, Noguchi, etc., active and positive clinical symptoms may prevail, while on the other hand with positive laboratory findings no symptoms or a distinct improvement in symptoms may obtain. In Corbus's table of secondary syphilis, patient 10, with cerebrospinal involvement, received fourteen injections with rubbings by a professional, four of them intraspinally—one after the Swift and Ellis technique, 20 Cc. of serum being given, and three after the method of Ravaut, 4 mg. being given at each injection. The spinal fluid is still involved. Patient 11, strong and vigorous, came under observation in the secondary period. Blood Wassermann always vacillated; spinal fluid examination December, 1913, Wassermann positive, Nonne positive, and lymphocytes 25 per cm. Since severe, persistent intravenous medication, spinal fluid examination March 24, 1914, revealed Wassermann negative; Nonne positive; lymphocytes 3 per cent. Total quantity of salvarsan injected 8.55 gm. Case 19, aged twenty-eight, robust and vigorous; severe ulceration in larynx, spinal fluid negative, blood Wassermann still positive.

Gonnet[8] reports the results in a series of twenty-three cases of tabes treated by neosalvarsan in which the doses, ranging from .45 to .9 gm., were administered intravenously. In eleven patients the lightning pains were considerably reduced; visceral crises however, which were noted in five cases, were relieved in but one instance. The general condition, trophic disturbances, ocular paralysis, urinary symptoms, pupilary signs, and tendon reflexes were not influenced in any of the cases. There is nothing definite to prove that salvarsan or serosalvarsan when introduced into the spinal canal comes into direct contact with the spirochæta or acts as a sterilizant. In Dr. Pillsbury's[9] report, in which he states he treated thirteen cases with salvarsan, he put only eleven cases in his tables, omitting two because one died after receiving one injection, and the other after receiving one injection showed no improvement and did not bear the salvarsan well. Of the eleven patients included in the table, the author states that six showed improvement, but not necessarily clinical; one is no better and four are dead. In most of his cases the improvement that has been shown is in the laboratory findings. Harlow Brooks and

John Carroll[10] conclude that, while salvarsan no doubt gives a prompt response, its permanency in tertiary consequences, referring to those of the heart, does not appear to be established unless the treatment is followed up by the protracted use of mercury. Further in the same article these authors say that where very prompt response to treatment seems to be necessary salvarsan is given, but in cardiac even more than other complications of syphilis a very serious degree of reaction may follow the salvarsan, and more than seldom we have been greatly alarmed by circulatory collapse which has followed the administration of salvarsan in those cases, especially in which signs and symptoms indicated particularly progressive invasion of the heart muscle. Glaser,[11] in speaking of the use of salvarsan in the treatment of scarlet fever, states that it had no influence upon the toxic symptoms nor did it ward off complications. In about one-half of the cases the dose, which was 1 mg. per kilo of body weight, was followed by chill, vomiting, and diarrhea.

Throughout the literature on this subject we often see such expressions as: "This treatment is without hazard or practically free from danger." Statistics scarcely justify these statements. Although the work of Ravaut and Marienaesco, especially their experiments *in vitro,* are indeed brilliant, the disaster of Los Angeles and extremely unpleasant results obtained at the Rockefeller Institute should act as a warning in the direct administration of these irritants. Lawrence reports five cases treated by the Swift and Ellis method in which two died, a mortality of 40 per cent. The others showed alarming symptoms. My own experience in the treatment of several hundred cases of tabes agrees with that of Mott and others, who found that these cases seldom gave a history of secondary manifestations of syphilis. This would seem to indicate that in cases in which the infection spends itself by strong tertiary manifestations nervous phenomena are less apt to occur, and there may be some relation of cause and effect between the prompt disappearance of the early manifestations of syphilis under treatment by salvarsan and the proneness to develop nervous conditions as tabes and paresis.

There is no doubt that syphilis of the nervous system has increased in frequency, at least in the early stages of the disease, since the use of salvarsan has become general. This can possibly be attributed to the lack of knowledge and therefore the rather experimental manner in which it has been used.[12] We should ever bear in mind that the spirochæta may not be actually killed, but its virulence only temporarily destroyed, to be regained later, when its ability to do damage will be as great as ever and it will then be immune to further attempts at treatment. I agree with Dr. Graves,[13] who, in discussing the papers of Drs. Riggs, Hammes, and Pillsbury at the meeting of the American Medical Association last June, stated that "the whole medical world is in the business of curing syphilis with salvarsan, but I am not yet convinced of its worth in any form as a cure in any period of human syphilis. The lack of criticism in this direction on the part of many of the medical men seems little short of appalling. There is no analogy between syphilis and any other disease unless it exists in leprosy. No man can say when the syphilitic is cured whatever the remedy employed. With due appreciation of the efforts of the discoverer of salvarsan, I believe that the idea that we may cure an infection by the introduction of a substance into the human body which is utterly foreign to the body is not founded on sound biologic principles. At most such substances are remedies acting perhaps by stimulating temporarily the resistance of the organism and not as sterilizers. Salvarsan does not sterilize the human organism of spirochætæ. If this is true, then we may at this time predict an epidemic-like increase in paresis and tabes and other nerve manifestations during the next ten or fifteen years. There is much evidence indicating that salvarsan takes away from the individual much of his fighting chance

against syphilis. Finger and others have shown that something like four times as many cases of early nerve syphilis occur after the use of salvarsan as occurred under the old methods of treatment."

I believe that any conservative man, after reading the report of Dr. Gordon[14]—the pitiable and indeed dreadful results following the use of neosalvarsan in a case which he treated and which resulted fatally—would hesitate long before subjecting his patient to the possibilities of such a dire affliction. The reports of Drs. Myerson, Gordon, and Charlton are sufficient evidence of the extreme hazardousness of administering this highly irritating substance. Although a great deal of effort has been put forth to lessen the force of this argument, these cases will stand out boldly and irrefutably. It seems scarcely reasonable to believe that if the patients were fully advised of the risks they were running in accepting the administration of salvarsan or neosalvarsan they would submit to it, and I believe that it is only fair to them in every case that the dangers and possible complications that may ensue from this substance be thoroughly explained. It would not at all surprise me if in the near future we would hear of a large number of damage suits following the administration of salvarsan to patients to whom its dangers had not previously been fully shown. I do not doubt that the courts would find it incumbent upon the physician to make this clear to his patient before placing him in jeopardy, and it is a question whether or not the court would relieve the physician of the responsibility of the administration of so dangerous an agent even if this explanation were made and consent given.

Gennerich[15] and others have called attention to the necessity for refraining from giving salvarsan if the patient is suffering from a febrile infectious process anywhere, or has just recovered from such infection, and bacterial toxins are still circulating in the blood. Gutman emphasizes the necessity for caution in this respect, especially since Yakymoff has found that mice given an intravenous injection of minute amounts of the endotoxin of the colon bacillus and then treated with salvarsan showed that the toxicity of the salvarsan had been enhanced nearly threefold by the preliminary treatment. The toxicity was enhanced eightfold when the mice had been mildly infected with trypanosomes, while stronger infection with trypanosomes enhanced the toxicity fifteenfold. The toxicity was most pronounced when the trypanosomes were still circulating in the blood. These experiences warn decidedly against injecting salvarsan unless several days have elapsed after a febrile infectious process. Gutman warns that trouble may be anticipated if the salvarsan is injected during the incubation phase of an infectious process or during a stage of latent microbism.

Only by careful determination of the fact that the patient is free from bacterial infection, latent or otherwise, can we be certain to avoid danger from these superimposed toxic actions and influences. If a febrile acute infection develops during the course of salvarsan treatment, he advises to wait at least a week or two before going on with the salvarsan. When the salvarsan is resumed, he insists on the necessity for commencing treatment anew with a very small tentative dose to test the patient's susceptibility before going on with the course. He describes four cases in which there was unsuspected latent microbism when the salvarsan treatment was commenced, follicular tonsillitis developing after a day or so, or ovarian trouble flaring up, and in such cases the salvarsan was followed by a serious general reaction, chills, fever, headache, somnolence, etc. Suspending the salvarsan until the infectious storm had blown over, it was resumed without further disturbance.

Perhaps the most scientific work in connection with this subject has been by Harrison S. Ogilvie.[16] He at least attempts to standardize his work and place it on a rational basis. But it clearly shows the highly irritating nature of the salvarsan even when not more than 1 mg. in a 40-per-

cent serum vehicle is employed. It produced a lymphocytosis of over 1000 cells per cm. in every case; while in one monkey 3.2 mg. caused paralysis of the hind legs. Wechselmann[17] found that salvarsan in solution of 1:500 or 1:800 produced convulsions and subsequent death in dogs when given intracranially. Marienaesco[18] reported severe reaction following the use of 5 mg. in a concentration of 1:800. Eight out of thirteen patients treated had vesical retention or incontinence; three had paresis of the lower limbs; and one had anesthesia below the site of puncture. He found that a solution of 1 mg. in a dilution of less than 1:10,000 invariably caused irritation.

A point emphasized by the study of the literature of this subject is that cerebrospinal syphilis, other than tabes or paresis, has done decidedly better than when either or both of these conditions are present.

In the administration of a remedial agent the first consideration must be the safety of the patient. Sterilization of the gastrointestinal tract has never been accomplished, and when we speak of intestinal asepsis we all understand that the term is used relatively. However, it can scarcely be doubted that complete sterilization of the gastrointestinal tract with death of the billions of germs that it contains could be accomplished by the use of bichloride of mercury, but in so doing we would not only destroy the germs but the host (the patient), and in this wide, wild desire to produce sterilization of the blood in cases of syphilis we must be careful not to destroy the patient. The complications that I have noted which were traceable to the use of salvarsan included profound prostration, suspension of animation, exacerbation of pains, paralysis of sphincters, bladder, and rectum, diffuse dermatitis, and optic neuritis.

In studying the results of the administration of salvarsan in sixty cases of tabes[19] which came under my care after having had this substance introduced by intravenous or intradural injection, I am unable to note any permanent improvement in a single case, while in a number of the patients the immediate reaction was very alarming, especially in one patient, a female aged forty years, in whom intravenous injection of .9 gm. of salvarsan produced an alarming depression and suspension of vital processes. A second injection of .6 gm. in two weeks was followed by a repetition of this same reaction. This patient showed no permanent effects of the salvarsan other than an increase in weight. In another patient, a male thirty-two years of age, the treatment greatly increased the pains and produced marked prostration, from which the patient never recovered, although the salvarsan was discontinued three years ago. In another patient the administration of salvarsan was followed by loss of control of sphincters of both bladder and rectum, which continued for a period of about six weeks, after which rectal control was partially regained, but the bladder sphincter is still incompetent.

I believe that this whole subject should be referred back to the research laboratory for further study before more damage is done to our patients. The manufacturers of this product should be required to conform to the rules of ethics exacted of American manufacturing pharmacists and remove all restrictions from the production of their wares in this country.

Among the questions which we must consider before using salvarsan and neosalvarsan are: first, in view of the disasters following their use recorded in the literature, are we justified in using them at all? Second, are there any contraindications in a given case, such as embarrassed kidneys or degenerative changes in other organs, which would make them especially dangerous? Third, in the light of statistics are we not placing ourselves in a position where we will be liable for damages? Fourth, do they or have they ever cured syphilis, tabes, or paresis? Fifth, have they changed the prognosis of syphilis, or can we accomplish anything in the way of permanent beneficial results by the use of salvarsan or neosalvarsan that we could not accomplish by the older methods? Sixth, do the rather spec-

tacular results obtained in some few cases warrant us in using these agents in the face of our absolute inability to predict when we should anticipate disastrous results?

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THE RESULTS OF ANTIMALARIAL PROPHYLAXIS IN ITALY.

The *Lancet* of March 27, 1915, tells us that for the last two years, in face of a slight increase in the mortality from malaria, a certain amount of pessimism has been rife in Italy, asserting that the hygienic measures hitherto adopted against that disease have reached their limit, and uttering a warning note that radical results are not possible without a profound transformation of the mosquito-ridden soil. Some observers think that the malarial parasite exists not only in malaria-infected man but also in some other animal, so that the infection of the transmitting mosquito arises not only from the gametiferous man but also from these other animals which harbor the virus. In a recent issue of *Il Morgagni*, Dr. E. Bertarelli, Professor of Hygiene in the University of Patma, draws attention to the fact that the mortality in 1912 again reached a lower figure, the lowest hitherto observed since the mortality returns have been published. In ten years these figures had declined from more than 15,000 deaths to 3000 with absolute regularity, which is in itself proof of the efficiency of the measures adopted. The figures also show that the diminution of mortality again recorded for 1912-13 coincides with an increase in the consumption of quinine provided by the state, while there was also during the same period an increase in the amount of quinine sold privately in the country. A connection between these facts may logically be assumed, and it is difficult to explain in any other way the reappearance of a decreasing mortality.

Professor Bertarelli argues that if gametiferous human beings are the only source of infection for the mosquitoes, it would follow that if these sources are eradicated malaria would cease by automatic necessity. With more assiduous administration of quinine fewer gametiferous beings must be formed and the old stock must be fatally exhausted in a certain number of years by the necessary reduction which death causes. These considerations, taken in conjunction with the reappearance of the diminishing mortality, suggests that apart from human beings no other sources of malaria exist. The author does not deny that the use of mechanical means of defense and the destruction of the mosquitoes have been attendant with conspicuous success, but he points out the difficulties inseparable from completely satisfactory achievement—for example, the destruction of hibernating mosquitoes, chiefly females, which are found in a condition of immobility in crevices and on walls. He is, however, strongly of the opinion that the free consumption of quinine in malarious districts is the weapon which has given the most certain and rapid results.

EDITORIAL.

THE CLINICAL MANIFESTATIONS AND TREATMENT OF COLIURIA IN CHILDREN.

With the constant development of bacteriological research it is becoming more and more evident that in every case in which fever is present this state depends upon a single, or mixed, infection with pathogenic germs. One of the most frequent occurrences in the life of a general practitioner is to be called upon to treat a child suffering from more or less persistent febrile movement, in which child he is entirely unable, by the ordinary methods of physical examination, to detect disease in the heart, lungs, or abdomen, and yet, do what he will, the fever persists and in some instances is accompanied by other manifestations of fairly serious illness. Many of these cases are now explicable by reason of investigations which have been carried out concerning the bacteriology of the urine with special reference to the condition of the pelvis of the kidney. In pregnant women and in young children in particular these conditions are by no means uncommon, and in children it would seem probable that in a great majority of cases the infection is due to the bacillus coli.

When this cause of illness and fever was first clearly determined it was suggested by several clinicians that the proper treatment would be an administration of full doses of alkaline diuretics, such as potassium citrate and sodium bicarbonate, since it was thought that the alkalinity of the urine so produced would be unfavorable to the growth of the bacillus coli. It is quite true that such a method of treatment not infrequently produces a moderate degree of relief, since it probably tends to aid in the elimination of toxic substances before they are absorbed, but further investigation has shown that the bacillus coli grows almost as well in an alkaline as in an acid medium, and that it is essential to employ measures which are more effective than the administration of an alkaline diuretic, namely, hexamethylenamine, which preparation sets free its formaldehyde in the pelvis of the kidney in direct ratio to the acidity of the urine. The efficiency of hexamethylenamine is materially diminished by the simultaneous administration of alkaline diuretics, but is materially increased by the simultaneous administration of full doses of acid sodium phosphate. In instances in which the symptoms are quite severe and the stomach is upset to the extent of vomiting, it is probably good practice, for a few days at least, to administer alkaline diuretics, which, if properly diluted, do not irritate the stomach, and then, when the symptoms are somewhat in abeyance, the hexamethylenamine and the acid sodium phosphate can be given for the purpose of actually combating the underlying cause of the illness. The second radical measure, other than the administration of hexamethylenamine and acid sodium phosphate, is to use a colon vaccine, preferably an autogenous vaccine, if such can be obtained, since there can be no doubt that autogenous vaccine is more efficient than stock vaccine. As this, however, requires the services of a competent bacteriologist and the loss of considerable amount of time, it is in some instances an almost impossible method of treatment.

An interesting article dealing with this important matter appears in the *Bristol Medico-Chirurgical Journal* for December, 1914, by Gordon. He points out that it is a great mistake to consider that coliuria is absent because definite renal symptoms are not present. He speaks of no less than five types of cases dependent upon colon infection of the pelvis of the kidney. In the first type there are no definite symptoms other than wretchedness with fever. In the second type nervous symptoms predominate. There may be a sudden, sharp attack of fever, with or without chills, and in rare

cases convulsions and sudden collapse. The further progress of the febrile movement may lead to anemia and the diagnosis of typhoid fever and malaria. There is often marked restlessness and irritability and sometimes pronounced muscular tenderness. In other instances the symptoms may simulate meningitis, the patient being delirious, convulsed or drowsy, and even comatose. In the third group the physician is led to believe that some pulmonary state, as pneumonia or acute bronchitis, has developed, as there is rapid breathing, sometimes dyspnea, high temperature, and general malaise. In the fourth group there may be sharp abdominal symptoms in association with the fever, such as vomiting, obstinate constipation, and equally obstinate diarrhea, with loss of appetite and occasionally jaundice. In the fifth type of case the symptoms are more definitely renal. Gordon thinks that they make up about 50 per cent of the cases. There may be tenderness in the neighborhood of one or both kidneys and a sufficient number of renal symptoms to call the attention of the physician to a possible pyelitis. There is still another type of case which occurs in older children or in adults, which may be equally misleading in that the symptoms are not definitely associated with any one organ, but in the presence of mild, continuous fever there is anemia, emaciation, and often extreme debility with periodical attacks of nausea.

In regard to the dose of colon vaccine which it is best to employ, it is probable that one may usually commence with a dose of 10 million, but it is rare that good results are obtained under 50 million. Gordon states that sometimes it is necessary to give 200 to 400 million before a cure is attained. In young children, of course, small doses should be carefully employed until their effect can be determined.

In this connection it is to be recalled that the bacillus coli is not always responsible for the pyelitis that we have just described, but that an examination of the urine will reveal other infecting microörganisms.

THE PROTECTIVE INFLUENCE OF CERTAIN FOODSTUFFS IN THE BODY.

With the development of our knowledge concerning chloroform poisoning, after the patient has recovered from the stage of anesthesia, we also learned by experiments upon animals, and by clinical experience as well, that these symptoms can be prevented or modified if the patient receives, for several days prior to the administration of the anesthetic, plenty of carbohydrate food in order that the liver is well stored with glycogen. The custom of starving the patient prior to operation, in order to prevent vomiting, has in consequence been modified on the part of many surgeons who recognize that while food immediately before operation is disadvantageous, there is no reason why patients should not receive easily assimilated, starchy food up to within a few hours of taking the anesthetic, provided, of course, the disease, by affecting the stomach and intestines, does not prevent digestion.

Anything which can be done to diminish the danger of the anesthetic, increase the comfort of the patient, and prevent serious postoperative complications is of great importance and interest, and all investigations which tend to emphasize these facts and to add additional interest to them are to be welcomed and carefully studied. For this reason we have read with much interest a communication in the *Journal of Experimental Medicine* of January 1, 1915, by Opie and Alford, in which they report the effect of diet upon the toxicity of chloroform and phosphorus, both of which are known, when taken in considerable quantities, to seriously affect the liver. They find that these substances are more toxic for animals which have received a diet of meat than for those which have received a diet consisting in great part of carbohydrate, as for example oats and cane-sugar. This protective influence would seem at least in part to be due to the fact that carbohydrates prevent destruction of hepatic and renal cells. They quote Voit, Rubner and

others as having shown that carbohydrate given to a healthy individual diminishes the amount of protein needed to maintain nitrogen equilibrium, and in infectious fevers reduces the elimination of nitrogen, which is important, as it is well known that the fever of acute infections is accompanied by increased excretion of nitrogen in the urine, due to augmented activity of protein catabolism.

The constantly increasing popularity of starchy food in acute infectious fevers is therefore based upon scientific facts, and readers of the GAZETTE will remember that we have called attention in earlier issues to the researches of Shaffer and Coleman, who showed that the loss of body protein which occurs in typhoid fever may be retarded by the use of a diet with a high caloric value, particularly if it is rich in carbohydrate. As there is a simultaneous diminution in the excretion of creatin and of total sulphur there is good evidence that the febrile destruction of body protein is really prevented by this means.

Of great interest in this connection is the statement of Tallquist that an increased quantity of carbohydrate food is required by cases of catarrhal jaundice, cholelithiasis with jaundice, cirrhosis, and other hepatic diseases, probably because the liver is no longer able to store glycogen effectively.

In concluding their investigations Opie and Alford state that chloroform is much more toxic to animals which have received a diet consisting in great part of fat than to those which have received meat, and to the latter more than to those which have received starches.

CITRATED MILK.

Five years ago a number of articles appeared in this country and abroad concerning the use of citrate of sodium as a means of modifying milk in such a way that it can be given undiluted even to very young babies. London practitioners, with large experience in the treatment of children of ignorant parents, found that this was a great advantage, since it avoided directions as to the proper diluting of milk, and permitted children, who were forced to take comparatively poor milk, to gain materially in nourishment. Our own experience with citrate of sodium, which acts chiefly by reason of the fact that it prevents the milk from forming tough curds, is confirmatory of the observations that have been made in this country and abroad. We have, therefore, read with much interest an article contributed to the *Clinical Journal* of London of December 16, 1914, in which Mann, who is physician to Out-patients, Evelina Hospital for Sick Children, gives the results which he has obtained. He found that rickets is, because of its frequency and severity, the greatest of all South London tragedies, and he states that since the introduction of citrate of sodium, for the purpose of modifying whole milk, hundreds of children have been successfully fed in this way, and their future development has been followed past the age for beginning school and into the years of the second dentition.

Mann has kept careful and accurate notes of many of these cases and is, therefore, fully qualified to express reliable opinions. He well says that usually when the breast milk fails the baby is fed for a few weeks on diluted cow's milk and fails to gain, or loses in weight, because it is not receiving adequate nourishment. Condensed milk is then tried, or a dried milk is used, neither of which meets the needs of the child, and various modifications in the methods of feeding are then resorted to, all of which often fail. When citrated milk is used Mann found that only a very limited number of patients failed to improve. The milk is never sweetened, the baby from the first being accustomed to the slightly salty taste of citrated milk. Extra carbohydrate with the milk is not allowed, but after the age of two months it may be given in the form of malt extract if it is desired, although some cases will not tolerate carbohydrate in this form. When malt is used it is never added to the regular milk feeding, but ordered dissolved in a little warm milk and given by spoon in

two or three portions between the bottle feedings. If the child is thirsty in hot weather, boiled and filtered water may be given between the feedings in small quantity. The quantity of citrate of sodium which is employed varies from one to two grains to the ounce, and it is never necessary to increase this quantity, some children being able to take whole milk with even smaller quantities of citrate of sodium. It is in the very difficult cases that as much as two grains to the ounce is advisable.

Not only does Mann recommend this method of feeding in full-term children, but also in premature babies, employing it as soon as the breast milk is found to be failing. He quotes one case of a premature infant, weighing only four pounds, who took ten feedings per day of 1½ ounces, equivalent to 75 calories per pound, and in another weighing five pounds, who always required a two-ounce feeding and invariably took ten of them. Both of these children are now between four and five years of age and are in good general health.

He then appends a table, which is interesting and of practical value, as to the use of undiluted citrated milk in premature infants:

Weight of baby.	Average quantities required: Feeds.	Total milk.	Total calories.	Calories per lb.
3 lbs	Ten ¾ oz.	7½ oz.	150	50
	Ten 1 "	10 "	200	66
4 "	Ten 1 "	10 "	200	50
	Ten 1¼ "	12½ "	250	62
5 "	Ten 1¼ "	12½ "	250	50
	Ten 1½ "	15 "	300	60
6 "	Ten 1½ "	15 "	300	50
	Nine 2 "	18 "	360	60

It is interesting to note that Mann is in accord with many others in finding maltose is tolerated far better than any other form of carbohydrate, and when given in the form of malt extract has a useful laxative action. When constipation is observed liquid petrolatum may be used.

Finally he gives us a concise report as to the results of employing citrated milk in six cases in which breast feeding was impossible and hand feeding with citrated milk was started soon after birth:

No. 1. At four months, 12 lbs. 4 ozs.; at five months, 14 lbs. 8 ozs.; at seven months, 17 lbs. 4 ozs.; at nine months, 20 lbs. 12 ozs.

No. 2. At twelve weeks, 13 lbs. 6 ozs.; at four months, 16 lbs.; at six months, 20 lbs.

No. 3. At three months, 13 lbs.; at seventeen weeks, 15 lbs. 8 ozs.; at six months, 18 lbs.; at twelve months, 27 lbs.

No. 4. At four months, 17 lbs. 4 ozs.; at six months, 21 lbs.; at nine months, 23 lbs.

No. 5. At three months, 15 lbs. 4 ozs.; at five months, 18 lbs.; at seven months, 21 lbs. 12 ozs.; at eleven months, 27 lbs.

No. 6. At four weeks, 10 lbs. 6 ozs.; at thirteen weeks, 14 lbs. 2 ozs.; at six months, 19 lbs. 4 ozs.; at eight months, 21 lbs. 2 ozs.; at twelve months, 26 lbs. 4 ozs.

CONTROL OF MALARIA.

The control of malaria in any given locality is entirely practicable, nor is it unduly expensive. It is based on prompt recognition and immediate sequestration from mosquitoes of each individual afflicted by the disease, and a filling in, or at least oiling, of all breeding-places for the pest.

Le Prince (*Public Health Reports*, Feb. 26, 1915) advises supplementing oiling the water surfaces by proper drainage. The object to be attained in using petroleum or other oils is to destroy larvæ of mosquitoes. To attain this, the surface of the water must be completely and continuously covered with a film of oil.

Under such circumstances the larvæ drown, nor do mosquitoes lay eggs on the surface of the water. The larvæ of the malaria-conveying species of mosquitoes rest and feed in a horizontal position at the water surface. They are more easily destroyed in nature by the application of oils or larvacide than are larvæ of most other mosquitoes. As a larvacide which could be applied with success during time of rain in Panama, Le Prince heated 150 gallons of crude carbolic acid containing not less than 15 per cent of phenols in an iron tank having a steam coil with steam

at 50 pounds pressure; 200 pounds of finely crushed and sifted common rosin were dissolved in the boiling acid, and then 30 pounds of caustic soda dissolved in 6 gallons of water were added. There is a mechanical stirring-rod attached to the mixing tank. It was ready in a few minutes, yielding about 2½ barrels. It was used by spraying an aqueous emulsion (one part of larvacide to five of water) over the surface to be treated and along the margin of pools and ponds or other mosquito-breeding places, so that the resulting dilution of the larvicide has a thin, milky opalescence representing approximately a dilution of 1 to 5000. A 1-to-1000 dilution was used for the destruction of larvæ in overflowing pools where the use of oil was not practicable. Kerosene or illuminating oil is useful, but it evaporates rapidly and is high in cost. It, however, forms a thin film, spreads rapidly, and is readily obtained in small or large quantities. Oil may be applied to watered surfaces of pools, ditches, streams, shallow lagoons, and edges of deep ponds, lakes, and rivers when necessary. Large water containers that are not protected against the entrance of mosquitoes should be protected with oil. It is unnecessary and expensive to oil collections of water that may be more economically treated by filling or drainage.

Larvæ of mosquitoes do not occur in bodies of water of considerable depth, unless aquatic plants, algæ, or débris are present. They are to be found near the banks of such bodies of water.

Oil should not be applied in places where mosquito larvæ do not occur. It may be applied to moving water in ditches and streams. More oil is required when used in oiling ditches overgrown with vegetation, shallow ponds containing grass, etc., because such vegetation impedes the formation of a complete film.

It is not advisable to oil water when the film will not remain effective, as just before rain-storms. During rainy periods the value of oiling is decreased. The ability of larvæ of mosquitoes to live under an oil film for an hour should be considered. Oil films will not penetrate a barrier of grass in water or move around similar obstructions. When such obstructions to the oil film occur on the water surface and are not removed, sufficient oil must be used to cover both the obstructions and the spaces between them. Wind will break up an oil film and transport all oil to one shore of the body of water.

In moving water, obstructions such as sticks, stones, brush, roots, and algæ, will sometimes interfere with the uniform spread of the oil film due to the division of surface currents.

Shallow bodies of water containing much grass may be too low to drain, as well as difficult and expensive to oil properly. They may in some cases be treated by either filling or ditching and collecting the water into a small area, which will then be more easily oiled.

Water surfaces may be oiled by using: A garden watering-pot; knapsack sprayer; a spraying apparatus in a small flat-bottom boat; a drip-can or drip-barrel for intermittent or continuous oiling; a small bundle of cotton waste soaked in oil.

It is not practicable to state how much oil should be used per unit of area. The density and spreading qualities of different shipments of commercial oils, and even of oil from the top and bottom of the same barrel, may vary so much as to upset all calculations. All oils spread better in warm weather. Just sufficient oil should be used to form a complete film. Laborers sometimes have difficulty in seeing where a film of kerosene is present on water, but can soon be so trained in the use of the other oils as not to apply more oil than is necessary.

The watering-pot is useful for limited areas, small pools, and where it is easy to get close to all parts of the propagation area. Relatively thick oil can be so applied.

The knapsack sprayer with adjustable nozzle is useful for all purposes. It will spray the lighter oils and distribute in a satisfactory manner the heavy commercial crude oils that have been treated with

phenol compounds. By its use oil may be placed wherever desired from one to twenty feet from the operator. This machine holds five gallons and rests on the shoulders and back of the operator. He pumps with one hand and directs the oil stream or spray with the other. While traveling over rough ground and not operating the pump the laborer has both hands free. With this apparatus the work is less tiring than using a watering-pot. No oil is spilled or wasted by too rapid application. The knapsack sprayer was extensively used in the antimalaria campaign at Panama and found to give excellent results as to proper distribution of oil and as a preventive against wasting oil. In using the treated heavier oils, spraying machines with adjustable nozzles do not really give an oil spray of particles of liquid as small as is used in the application of insecticides. Such fineness is not essential. The oil is so distributed that its subsequent spread soon takes place, and that is all that is desired.

Spraying machines with hand pumps are used in small, flat-bottom boats for oiling parts of lagoons, lakes, bayous, edges of stagnant rivers, etc., near settlements, where such bodies of water cannot be more economically controlled by drainage, or cleaning and fish control.

The use of "oil drips" for intermittent or continuous application on ditches or streams containing moving water has proved satisfactory. Where the heavy oils are used the drip-can is placed three to four feet above the water surface, so that the drops of oil strike the moving water with a blow and at once change into a thin oil film. The stand, base, or object that supports the drip-can must be secure and beyond danger of removal by flood waters.

The disadvantage of oil drip-cans is that they will not give satisfactory service without proper attention, may become clogged, or be washed away by floods. Their use is generally more effective and economical than the direct application of oil by sprinkler or knapsack sprayer for water in motion. A thinner, but satisfactory, film of oil is obtained from the heavier cheap oils.

GOITRE.

The enormous literature of goitre, covering its various phases, is so widely scattered in recent current literature that a brief summarization of the established facts of the disease is distinctly serviceable. This is found in the *Albany Medical Annals* for March, 1915. Hawn in an article from the etiological standpoint states that little is known aside from the fact that the disease is most frequent in the early adult life of the female. As to underlying causes, these are regarded as toxemic, as nervous, or as infectious. The unbalanced function of the physiologically related glands or organs has undergone of late considerable investigation, and gives promise of affording a field for extensive research. Exophthalmic goitre is described as a constitutional disease due to excessive functional activity of the thyroparathyroid apparatus, and to the resulting dilatation of all arteries which the excess of secretion causes, probably by sensitizing the depressor nerve. The degree of enlargement of the thyroid seems to have very little relation to the gravity of other symptoms.

The symptoms are classified as nervous and circulatory, the nervous symptoms being constant. Restlessness, excitability, and insomnia afford a usual grouping. The most characteristic symptom is tremor, which may become so marked and widespread as to simulate chorea and tetany. The tremor is usually rapid and regular; moreover, there is flushing, local congestion, anemia, sweating, and diarrhea. Circulatory symptoms are expressed usually in the form of palpitation, though tachycardia may exist without the knowledge of the patient. Its degree is a fairly good index of the severity of the disease. There is usually moderate secondary anemia. Tremor and tachycardia stand out as the most constant and striking symptoms. Knudson, writing on the chemistry of the thyroid, speaks of the thyreo-globulin, the iodine-containing substance which constitutes about one-fourth to one-half of the dry weight of the gland and seems to be the

sole active constituent of the colloid, since its administration to animals has the same effect as the administration of the entire gland in that it increases elimination and lowers blood-pressure. Iodized protein artificially prepared shows none of the activity of the thyreo-globulin. The gland has marked influence on metabolism and may be efficient in preventing intoxication. The increased nitrogen elimination comes not only from food, but also from increased tissue destruction. This is shown not only in the increased destruction of tissue, including body fat, but the loss of thyroid reduces both nitrogenous metabolism and oxidative processes. Administration of the gland preparations in such conditions will bring nitrogen elimination and the gas exchange back to normal.

Deficient thyroid secretion in young animals prevents their developing normally. In adult animals decreased metabolism occurs and trophic changes in the skin and its appendages, an increased amount of mucin-like material in the tissues, and greatly decreased mental and nervous activity. All of these conditions are relieved by the administration of thyroid tissue or its preparations. The evidence that the thyroid has for its function the destruction or neutralization of poisonous substances found in metabolism or through intestinal putrefaction is as follows:

After total removal of the thyroid from many species of animals acute symptoms develop that suggest strongly an intoxication.

After removal marked changes occur in the blood, severe anemia (as low as two million red corpuscles) with some leucocytosis, and structural changes in the blood-vessels. Cytoplasmic degeneration of the liver, kidneys, and myocardium may also result. These results strongly suggest the presence of poisonous substances in the blood of persons or animals lacking sufficient thyroid tissue.

All the effects of thyroidectomy are more marked in carnivorous animals than in herbivora; indeed, the latter may be able to live in fair condition for several years without a thyroid. Blum found that thyroidectomized dogs, which were doing well on a milk diet, developed symptoms of athyreosis immediately they were given meat. This fact has been interpreted as indicating that toxic materials are formed from meat in the intestinal tract, which under normal conditions are neutralized by thyroid. On the other hand one may well imagine that the so-called autointoxication in athyreosis is not from intestinal putrefaction, but is due to incomplete protein metabolism within the tissues.

Reid Hunt found that mice fed thyroid preparations have a greatly increased resistance to poisoning by acetonitrile. However, this may be due to alteration in metabolism.

It has not been conclusively determined that exophthalmic goitre is due to intoxication with excessive amounts of thyroid secretion either normal or abnormal, but there is abundant evidence in favor of this view. Most important is the similarity of exophthalmic goitre to the effects of hyperthyroidism or thyroidismus produced either experimentally or through overuse of thyroid extract for therapeutic purposes. In thyroidismus there are observed rapid, weak pulse; greatly increased metabolism, especially of protein; increased secretion, especially of perspiration; marked nervousness and irritability, often with mental confusion and delusion; gastrointestinal disturbances, especially diarrhea; sweating, flushing, tremors, palpitation of heart, loss of weight, and slightly increased temperature are also noted, and not rarely typical exophthalmos may appear. Reid Hunt's acetonitrile test for thyroid secretion has been positive in blood from patients with exophthalmic goitre, which presumably means the presence of an excess of thyroid secretion circulating in the blood in this disease.

Kellert states that he finds that Graves's disease is characterized by a more or less constant lesion. There is loss of colloid associated with marked glandular hyperplasia. It is this increased amount of secreting parenchyma which gives rise to the

symptoms. A lymphocytosis of twenty-five to fifty-eight per cent is often present, although these figures are not corroborated by statistics from the Mayo clinic. Cases coming to necropsy show dilatation and hypertrophy of the heart, with fatty changes in the liver and kidneys. Those cases that die directly after operation invariably have an enlarged thymus.

Concernings the medical therapeusis of exophthalmic goitre, Corning observes that so far sera for practical purposes have not come into very general use. This is in part due to their great difficulty of preparation and administration, but also because none has as yet been offered to the profession that can be relied on in all cases.

Of medicinal agents other than sera, we have many. Aconite, veratrum viride, ergot, quinine, strophanthus, belladonna, sodium phosphate, opium, and arsenic are the drugs more commonly employed. Electricity, *x*-rays, dietary and eliminative procedures, rest cures, and hypnosis, all have their adherents. It is obviously impossible to enter on any discussion of the relative merits of these methods. Indeed, even if time permitted it is doubtful if any trustworthy conclusions could be reached. Men of the highest integrity, speaking with the authority of wide experience, report success or failure with these agents in a way that at first seems irreconcilable. Thompson, working on the theory that the disease rests on a gastrointestinal basis, achieves results by dietary and eliminative therapy that are as brilliant as those obtained by Forchheimer, whose main dependence is on the neutral hydrobromate of quinine given in combination with ergot. Bulkley, reviewing the results obtained by the use of eight of the different agents included in the group of serum therapy and organotherapy, arrived at the conclusion that from all of the sera palliation seems certain and cure possible.

First, rest; second, careful attention to the gastrointestinal tract. This includes a careful study of the patient's individual peculiarities and the absolute avoidance at first of meat. Every effort should be made to promote elimination by free action of the bowels even in the presence of diarrhea, plenty of water being given.

The gauge of betterment is dependent not on the patient's subjective symptoms. The temperature, the weight, the pulse-rate, the blood-pressure, the measurement of the neck, color of the skin, and the degree of exophthalmos are indices upon which judgment must be based, though it is true that statements concerning nervousness, sleep, appetite, thirst, loss of weight, condition of the bowels, and perspiration are to be given due importance. After the general treatment as indicated above a certain number of cases become obviously surgical. In others the betterment will be such as to practically insure a complete recovery. In still others symptomatic treatment is indicated—such, for instance, as the use of strophanthus, of arsenic, and certainly in some instances the combination of the neutral hydrobromate of quinine with ergot as advocated by Forchheimer; though in some cases this produces cinchonism. Electricity and *x*-rays, or serum, have all recorded their successes.

As to the surgical treatment Traver wisely observes that this is indicated in all cases in which the acute attacks recur and become more severe, notwithstanding the fact that the proper medical treatment has been carried out. Because of the degenerations which ultimately ensue incident to these recurring attacks the operation should be done before such occur. Crile's method of stealing away the thyroid is warmly advocated. Local anesthesia and novocaine is regarded as the safest method. The injection of boiling water is regarded as distinctly serviceable, and as the first procedure before ligation or excision; and ligation of a single thyroid artery is regarded as the next least dangerous form of intervention. The mortality-rate Travers states has been reduced from 30 to 2 per cent. Even this low death-rate can be attributed to the delay of operation until marked degeneration of the heart muscle has occurred. Mayo is quoted to the effect that operation gives 75 per cent of cures. The remaining

25 per cent are improved, amount of improvement depending on stage of disease and complications present at time of operation. About 10 per cent may have some return of their symptoms within three years.

Emphasis is placed by practically all operators upon the postoperative treatment of exophthalmic goitre. This should be prolonged and should include mental and physical rest, a careful diet, and until the blood and nervous system and the heart have thoroughly recovered from the effects of the disease excitement and stress of all kinds are particularly to be avoided.

REPORTS ON THERAPEUTIC PROGRESS.

ON THE THERAPEUTIC USE OF AQUEOUS EXTRACT OF LEUCOCYTES (HISS) IN LOBAR PNEUMONIA.

In the *Journal of Medical Research* for January, 1915, WILLIAMS and YOULAND report upon this subject, saying that the results of leucocyte extract in a series of seven cases of lobar pneumonia seem to bring out certain points rather sharply. Hiss, Floyd and Lucas, Dwyer and others believe that they have seen definite evidence in their cases that leucocyte extract exerts its action by modifying the temperature and lessening the other symptoms that are called toxemic. Williams and Youland were unable to observe such an effect. The temperature ran a uniform and high course, and the toxemia was apparently not influenced. Of the seven patients four died. Two of these were alcoholic. In all of the patients but one the total amount of extract used was large, and the single doses were frequently unusually generous, amounting in one instance to even one hundred cubic centimeters. Whatever the size of the dose, they were unable to detect any results from its administration. A study of the temperature charts, of the pulse record, and of the leucocyte count, reveals the lack of apparent effect of the remedy. The treatment was begun about as early as can be hoped for, but the leucocyte extract seemed to be equally disappointing regardless of the period of the disease in which it was administered. They have given repeated uniform doses, single moderate doses, and single large doses. The total dosage in the different cases was twenty, seventy, ninety, one hundred and ten, one hundred and seventy-five, one hundred and ninety, and three hundred and twenty cubic centimeters, respectively. The daily dose varied from ten to one hundred cubic centimeters.

The duration of the disease and the manner of its termination, whether in recovery or in death, are about what one would meet with in any similar series of typical cases of lobar pneumonia that were untreated.

The negative results that Williams and Youland have obtained from the use of leucocyte extract in this series of cases, as regards its action upon the temperature, the leucocyte count, the condition of the patient, and upon the course and termination of the disease, offer little hope of any appreciable therapeutic results from the use of this agent in lobar pneumonia.

HOW MALT SOUP IS PREPARED—WHAT IS ITS VALUE AS A FOOD?

The *New York Medical Journal* of January 16, 1915, points out that malt soup is generally recommended during the first three months of life. It is avoided during the first fourteen days. It was introduced into medicine by Liebig in 1865, and modified with advantage by Keller in 1896. Liebig's monograph appeared in 1866, Suppe für Saüglinge, Brunswick. Keller's article is found in *Terapie der Gegenwart*, 57, 1901. It appears that the original use of malt soup in acidity was scarcely justified. However, Gregor and Keller reported seventy-three and twenty-eight cases in which it was successful. Later, Rosenthal adopted it in gastric catarrh and in atrophy of infants during the first year. He pub-

lished the results in the *Nordisk Tidsskrift für Terapi*, 1905. They suffice to establish the use of malt soup at the Copenhagen clinic. It was thus prepared: Fifty grammes of wheaten flour and one-third liter of sweet milk were beaten and strained. In a separate vessel forty grammes of malt extract (Denzon's) were dissolved in two-thirds liter of water at 50° C. The two solutions were then mixed, and a teaspoonful of an eleven-per-cent solution of potassium carbonate added. The mixture was placed on the fire, boiled without stirring, and poured into the nursing bottle. Soxhlet's sterilizing apparatus was used for three minutes. (The article does not state the quantity of sugar. Professor Esser says the proportion should be eighty grammes to the liter.) The bottles are placed as soon as possible in the ice-chest. (Esser's article may be found in a recent publication: *Therapie an den Bonner Universitätskliniken*, p. 118, 1914.)

The difference between Keller's malt soup and Rosenthal's is that Keller employed 100 grammes of malt extract instead of forty. The last formula is published in the *Medizinische Klinik*, 276-278, 1914, by Erich Müller and Ernst Schloss. It is as follows:

The vessels in which the mixture is made are filled to 330 Cc. with raw milk. Previously fifty grammes of wheaten flour are boiled in three-quarters of a liter of water for twenty minutes; this is poured into the first vessel, 100 grammes of Loflund's malt soup extract added, and the whole filled up to 1000 Cc. with tap water. The mixture is divided in five bottles and sterilized in Soxhlet's apparatus for two or three minutes.

According to Müller and Schloss, less sugar and malt extract are preferable for very young children, or instead of Soxhlet's sugar an equal quantity of malt extract may be substituted. The change is particularly indicated in diarrhea. They also recommend the addition of fifty grammes of cream to increase the amount of fat, if the baby digests the malt soup satisfactorily.

The indications for the use of malt soup, according to Israel Rosenthal and Oerum (*Archiv für Kinderheilkunde*, 62, 169, 1914), are gastrointestinal catarrh and atrophy. They administered it to 242 babies; and mortality was 11.56 per cent. But two babies manifested signs of Barlow's disease. They were very ill-nourished when admitted to the hospital. The inference—borne out by the charts of weight, etc.—is that malt soup was most beneficial.

USE OF EMETINE FOR HEMORRHAGE FOLLOWING NASOPHARYNHEAL OPERATIONS.

In the *Medical Record* of January 16, 1915, WEINSTEIN writes on this topic.

The following report of 12 cases in which emetine was successfully employed to control or prevent hemorrhage during and after operations upon the nose and throat is not submitted by the writer as a positive statement that emetine will control all such cases of hemorrhage, but as an invitation to his fellow workers in the field of rhinology and laryngology to coöperate with him in the "trying out" of a remedy which, if found to be efficacious, will be of inestimable benefit.

Pelletier, in 1867, separated from ipecacuanha its emetic principle and named it emetine. Paul and Cownley in 1894 isolated its two crystalline alkaloids, emetine and cephaeline. Since then emetine has been most successfully employed in several fields of medicine. Captain Edward P. Vedder, U. S. A., and Dr. Leonard Rogers of Calcutta have demonstrated its use in cases of amebic dysentery, in which they are supported by such men as Chauffard, Dopter, Lukis, Low, Allen, Friedenwall, and Zobel.

Rogers has also demonstrated its uses in cases of amebic hepatitis, and with others its value diagnostically, the true amebic dysentery reacting to emetine within three days after its injection hypodermically.

Renault has recently employed it in the treatment of cholera, obtaining, in a severe epidemic, 73 per cent of recoveries. Flandin and Joltrain used emetine successfully

in the hemoptysis of tuberculosis, and French physicians for hemorrhage occurring in typhoid and uterine hemorrhage following cancer.

Dr. Joseph P. Prestley employed it successfully in controlling a case of obstinate nosebleed, and Dr. William Sellers in a case of persistent hemorrhage from the gums. In 1914 Barrett and Smith demonstrated its use in pyorrhea alveolaris and also state that emetine hydrochloride given subcutaneously is likely to prove curative in many cases of tonsillitis. In this they are supported by Middleton.

No mention seems to have been made thus far in the literature of emetine having been previously employed in nasopharyngeal surgery, and in using the drug in this field the writer has been influenced entirely by his own studies and observations. The action of emetine upon hemorrhage has not, as yet, been satisfactorily explained. It does not coagulate the blood nor does it lower the blood-pressure, but apparently acts directly upon the capillaries by closing them up.

The writer is mindful of the small number of cases which he is submitting in testimony of the efficacy of emetine to control hemorrhage of this class, but trusts that this report may be a nucleus about which many other reports of the successful employment of emetine in this field will rapidly grow.

THE USE OF PITUITRIN AS A COAGULANT IN THE SURGERY OF THE NOSE AND THROAT.

In the *Journal of the American Medical Association* of January 23, 1915, GORDON tells us his experience with this plan of treatment.

Pituitrin was administered hypodermically in the dose of 12 minims to children and 15 minims to adults, not less than fifteen minutes before the intended anesthetic. The coagulation time was taken before and again after the fifteen-minute interval. The blood-pressures were taken at the same intervals. The coagulation time was determined in the early cases with the Brodie and Russell coagulometer, and the remainder of the cases by the drop-on-the-slide method.

1. The coagulation time of the blood is materially reduced by the hypodermic administration of pituitary extract.

2. The hemorrhage following nasal and throat operations is much reduced, especially operations on the turbinals.

3. The effect on the blood-pressure of children is variable, as follows: Systolic pressure was increased in 55.31 per cent of the cases, reduced in 36 per cent, and unchanged in 8.5 per cent. Diastolic pressure was increased in 35.5 per cent of the cases, reduced in 35.5 per cent, and there was no change in 29 per cent. Pulse pressure was increased in 61 per cent and decreased in 39 per cent of the cases.

VACCINES IN RELATION TO MOUTH INFECTION.

HEAD, in the *Medical Record* of January 16, 1915, tells us that as in the treatment of all diseases with vaccines the depots of infection must be removed by every means possible so that the work of the antibodies will be reduced to a minimum. This is particularly the case in the treatment of mouth infections, and all of the bacterial masses, dead epithelial scales, and food remnants must be carefully removed each day with floss silk, tooth-brush, and mild washes if the vaccine treatment is to prove of value.

When the bacterial masses have been removed so that only a thin film remains, there are two mouth-washes that may prove exceedingly valuable as a means of discouraging further growth until the time arrives for the next cleansing. These two washes are one-per-cent peroxide of hydrogen made slightly alkaline, and a saturated aqueous solution of sodium silicofluoride which has a strength of 0.61 per cent. These washes held in the mouth for a minute or two after the mechanical cleansing prove of value clinically, and their daily use is of great assistance in reducing the areas of mouth inflammation. This is particularly interesting as Anderson has shown that peroxide in such strength for such a

time has no carbolic acid coefficient, and researches by Hitchens have proved the same thing about sodium silicofluoride as a mouth-wash. And yet they are of value clinically. Ehrlich in his address appearing in the *Lancet,* August 16, 1913, showed how the spirochæta pallida, when subjected to the action of salvarsan, had the same mobility and life apparently as the organism that had not been so treated; and yet the spirochæta pallida treated with salvarsan could be digested by the leucocytes in a manner impossible when the organism had not been subjected to the action of salvarsan. May not this be the explanation of why non-antiseptic mouth-washes are at times more effective than those that have a high germicidal efficiency? May not the mild peroxide or sodium silicofluoride sensitize the germs so that the ferments of the blood or saliva can digest the otherwise undigestible germs? This is advanced as a possible explanation of the unquestioned value of certain washes that of themselves seem inert.

In addition to the regular daily hygiene of the mouth it is necessary that all dead or infected pulps should be carefully removed and the root canals filled, for many pockets of infection around teeth with living pulps resist all systemic treatment or local applications until such depots of infection have been removed. It is also just as essential that all tartar should be carefully curetted from the roots of the teeth, as its presence always acts as a source of infecting irritation. There is also another valuable therapeutic agent for softening tartar scale and reducing the inflammation of the gums in the weekly application of the acid hydrogen ammonium fluoride. This consists of 20 parts hydrogen ammonium fluoride, 10 parts free hydrofluoric acid, water q. s. to make 100. This, according to the tests of Hitchens, has a carbolic acid coefficient of 5.82, and should be applied with a platinum pointed syringe with a celluloid barrel, as it attacks glass. This drug, when properly used, with careful instrumentation is particularly effective in the local treatment of mouth infection. For unless the tartar scale is absolutely removed, healing and reattachment of the infected gums to the roots is impossible.

When we come to the systematic treatment of mouth infection a judiciously selected vaccine, in the writer's opinion, gives most excellent results; but since the local and general treatment should always be used in conjunction, it is often difficult to determine the exact proportion of credit for the cure that should be given to each. The local treatment alone has been so effective at times that the writer is forced to admit that had he been using the vaccine the vaccine would have had a measure of credit. And yet he is convinced and is morally sure that, as a general condition, properly selected vaccines cause a healing and permanency of result that are impossible with local treatment alone. In fact, the results of vaccine treatment are usually cumulative, as shown by the continued improvement in the local conditions for a year after the course of vaccine treatment is finished.

And so the four principal drugs the writer has used in the treatment of mouth infection are: Hydrogen peroxide, sodium silicofluoride, acid hydrogen ammonium fluoride, and vaccines. All drugs have disadvantages as well as advantages. The advantages of these drugs have been dwelt upon; their disadvantages are as follows: One-per-cent peroxide cannot be used in some mouths without causing great irritation. Sodium silicofluoride wash is generally useful in reducing inflammation and tartar scale, but in about one per cent of the cases it increases the deposit on the teeth or causes nausea; ordinarily, it is considered agreeable as well as useful. The bifluoride properly applied is invaluable, but is exceedingly sour and disagreeable. It also causes nausea in a small percentage of patients. However, the great proof of its efficiency lies in the fact that patients generally submit to its weekly applications for long periods of time. The vaccines have the great disadvantage of occasionally causing headache, nausea, and various reactions in the muscles and lymphatics. In rare instances there is the appearance of a

rash, and mild symptoms of serum sickness. This latter, with vaccine, is almost negligible, since three billion staphylococci or streptococci weigh only a milligramme or less. Thus, if these microörganisms were considered as pure protein, which they are not by a large per cent, these appalling doses of bacteria would contain less than a fourth of the protein found in 0.05 Cc. of horse serum. And 0.05 Cc. of horse serum is the dose suggested by Vaughan as a preliminary dose to be given to a patient as a test whether he can safely take antitoxin. According to Lewinsky, horse serum contains 80.4 mg. of protein per Cc.

In forty-two of the writer's cases, the complete bacteriology of which has been reported by Dr. Claude P. Brown, the presence of six principal germs was noted in such a large proportion of cases that the scattering of other germs appeared so insignificant as to make them seem almost in the light of accidental flora.

These germs were: Streptococcus, among which, especially in winter, was found the streptococcus viridans; pneumococcus; bacillus influenzæ; micrococcus catarrhalis; diphtheroids; and staphylococci. It was decided to take all the strains of these germs occurring in these forty-two cases, and after mixing them form a stock vaccine, of which each cubic centimeter of syringe A would contain pneumococcus, streptococcus mixed, micrococcus catarrhalis, 12½ million each; staphylococcus albus and S. aureus, 50 million each; bacillus influenzæ and diphtheroids, 50 million each. Syringe B contains twice as much as syringe A, syringe C twice that of syringe B, and syringe D twice that of syringe C. So that syringe D contains pneumococcus, streptococcus, micrococcus catarrhalis, 100 million each; staphylococcus aureus and S. albus, 400 million each; diphtheroids and bacillus influenzæ, 200 million each. This vaccine has given most encouraging results, and a few of the cases in which it was used will be specifically reported, but the writer hopes in another year to be able to make a more complete report that will throw conclusive light on its therapeutic value.

As the consistency with which these seven germs were found in the pockets of infection around the teeth may be due to the method used in taking the material for the vaccine, a description of the writer's technique may prove of value. The tooth should be protected from mouth contamination by a sterile napkin. The neck of the tooth adjacent to the pocket of infection should be then thoroughly washed with cotton soaked in salt solution and then dried. This will remove the masses of extraneous mouth flora. The edges of the pocket of infection and the adjacent tooth should now be slightly seared with a cherry-red cautery, which can be accomplished with practically no pain to the patient, and then a small cup-shaped spear of thin platinum should be heated to a cherry-red and plunged to the bottom of the pocket. In this way a two-fold purpose is at once accomplished. The extraneous germs near the edge within the pocket are destroyed and the deep-seated germs alone are collected on the thin platinum point, which has cooled before reaching them. This renders it possible to carry to the blood agar only the germs directly responsible for the disease in question. The vaccines so obtained were made up to contain all the germs found except the spore formers and the anaerobes. While it is possible that the bacteria of these classes may play a rôle in the infections, the writer's experience indicates that this rôle is a minor one.

THE TREATMENT OF HEMORRHAGE BY INJECTION OF BLOOD.

In the *Journal of the American Medical Association* of January 23, 1915, CURTIS reaches these conclusions:

1. Repeated subcutaneous injection of whole blood immediately on withdrawal from a healthy donor is a simple procedure of value in the treatment of hemorrhage.

2. In many cases of uterine hemorrhage this therapy obviates the need of operative interference or expensive and time-consuming Roentgen-ray treatment.

3. For persistent hemorrhage of moderate severity—for example, hemorrhage of

the new-born—blood injection rivals transfusion in results achieved, and is the method of choice because it requires little technical skill. In infants with severe anemia, intravenous injection of blood by means of a 100-Cc. lubricated ground-glass syrnige is a worthy substitute for a transfusion operation.

4. Hemotherapy for chronic anemias, wasting disease, and infections with grave outlook deserves serious consideration. It is not unlikely that the stimulating effect of repeated injections of blood offers more hope in this field than does the more difficult procedure of one or even two transfusions of large quantities of blood.

THE ALCOHOLIC INJECTION OF THE INTERNAL BRANCH OF THE SUPERIOR LARYNGEAL NERVE.

Writing in the *Boston Medical and Surgical Journal* of January 21, 1915, SOBOTKY reminds us that a more distressing picture than that presented by an advanced painful tuberculous laryngitis is hard to find. The patients have such exquisite pain in attempting to swallow that they often refuse food. As tuberculous laryngitis is almost invariably secondary to phthisis, a disease in which forced feeding is essential, it is easy to recognize that the lessened nutrition materially hastens the outcome.

Pain on swallowing may appear early and is present when any part of the upper aperture of the larynx is involved in the tuberculous process. Involvement of the epiglottis renders the prognosis more dubious and the symptomatic treatment less satisfactory. In such cases the swallowing of food causes pain, while in tuberculous affections of the arytenoid region the swallowing of fluids gives pain.

Ulceration of the posterior wall of the epiglottis or of the arytenoid cartilages produces the most severe pain, but infiltration of the muscles or perichondritis may also produce pain.

Various anodynes may be applied to the larynx to render feeding more comfortable. Cocaine of 5-per-cent strength, novocaine, or beta-eucaine may be applied or sprayed on the larynx shortly before meals, but orthoform is more advantageous and the effects last longer. However, all these anodynes give only fleeting relief, and the pain returns in twenty minutes to two hours after application. The blocking of the internal laryngeal nerve by injecting it with alcohol gives the greatest and most permanent relief to these unfortunate sufferers.

The superior laryngeal nerve is the sensory nerve of the larynx. It is a branch of the pneumogastric and arises from the middle of the inferior ganglion of this nerve. It descends behind the internal carotid artery, between the middle and the inferior constrictor muscles, and divides into the internal and external laryngeal nerves. The internal nerve penetrates the thyrohyoid membrane and supplies the mucous membrane of the larynx. The branches of this nerve form plexuses beneath the epithelial layer of the mucous membrane, end in bodies similar to the taste buds of the mouth, and are surrounded by ganglion cells. These are fewer in the vocal cords. The internal laryngeal nerve is accessible for injection at the point where it pierces the thyrohyoid membrane.

Place the patient in a recumbent position. Using the usual aseptic precautions, locate by pressure the tender spot where the nerve pierces the thyrohyoid membrane, usually at the upper edge of the thyroid cartilage and one-third the distance from the outer edge. Introduce a somewhat blunted needle about one and a half centimeters into this point at right angles to the skin. Should the patient cough, the needle is in the lumen of the larynx and must be withdrawn. He must be forbidden to talk or to shout and told to signify ear pain by raising his hand. If the introduction of the needle has produced no discomfort, turn it upward and outward toward the ear, and if this does not produce intense pain move the needle cautiously in various directions until the pain, referred to the ear, is produced. The instant the patient shows he is in pain, push the piston of the syringe slowly and allow only one or two drops of the 85-per-cent

solution of alcohol to escape. If this augments the pain inject one to one and a half Cc.

In successful injections there is little inflammatory reaction about the site. The pain on swallowing disappears and does not return for anywhere from ten days to three months. If both right and left internal laryngeal nerves are to be injected, as is usually necessary, it is best to wait two or three days between injections.

Some laryngologists use a ½-per-cent solution of cocaine with the alcohol, as this mixture diminishes the pain of the injections. However, patients have had so much pain that they cheerfully stand the temporary discomfort of injection.

If the needle is too far back, the superior thyroid or the external carotid artery may be pierced. If too low, the thyroid cartilage; if too high, the hypoglossal nerve. If the alcohol gets into the larynx it produces a local inflammation that adds to the patient's discomfort for a short time. Should the alcoholic injection fail to relieve the pain, it can be repeated in two or three days. It is perhaps needless to say that if the ulcerations are located at parts not supplied by the nerve a good result cannot be hoped for by this treatment. Methofer reports 17 tuberculous laryngitis cases, with painful deglutition, treated by alcoholic nerve injections. All except one were free from pain within twenty-four hours. The duration of relief varied from five days to three months. Roth of Bad Reichenhall, R. Hoffman of Munich, and H. Horn of San Francisco also report good results.

PITFALLS AND MISTAKES IN THE TREATMENT OF SYPHILIS.

ZIGLER in the *New York State Journal of Medicine* for January, 1915, asserts that it is a great mistake to cauterize an initial lesion for the following reasons: First, because an initial lesion is made more malignant, chronic and indolent; secondly, because the cauterization causes the sore to spread. The tendency to spread is particularly well marked if the lesion is cauterized more than once. The explanation of this is very simple when one considers the pathology of syphilis. The initial lesion is essentially a round-cell infiltration; if one cauterizes this chancre there is destroyed a certain amount of tissue; if one recauterizes he destroys still more. So that, as this area in the center of the round-cell infiltration is already cut off from its blood supply, there is simply added additional trauma without giving the sore a chance to heal. Furthermore, by cauterization one is very apt to cause infiltration and induration in a lesion that is soft, so that in this manner one may mask the diagnosis in that one may cause infiltration in a chancroid and then think he is dealing with a chancre. Of course, there are exceptions to the rule above mentioned. In the case of a sore on the penis, whether hard or soft, where the lesion is spreading so rapidly as to threaten the organ, one is justified in cauterization. Where the lesion is a chancre, it is best to use a mercurial caustic, such as the solution of acid nitrate of mercury.

EXERCISES IN THE TREATMENT OF TABES.

The *Boston Medical and Surgical Journal* of January 21, 1915, points out that owing to the development of salvarsan therapy and the recognition of the fact that tabes must be taken out of its old category as a parasyphilitic disease and regarded rather as a late manifestation of the original infection, renewed interest in its treatment has been natural and inevitable. Experience is now sufficiently extensive to make the definite statement that tabes is distinctly influenced by arsenic therapy, and it is, perhaps, not too much to say that, if taken in its early stages, it may be cured, or at least rendered stationary for an indefinite period of time. The enthusiasm which has attended this therapeutic outlook has, perhaps, distracted our attention from other useful, if less brilliant, methods of treatment. This is unfortunate, since it must be apparent that however beneficial salvarsan therapy may be, it can by no means be regarded as

curative in well-developed stages of the disease. Its influence on pain and the various discomforts incident to the disease is now somewhat universally recognized, but that it can, unaided, overcome a pronounced ataxia of long duration is not to be expected, and this it certainly has not succeeded in accomplishing in any notable degree. As an adjuvant, therefore, to the salvarsan treatment, which should become a routine measure in practically all cases, stress should certainly continue to be laid upon the principle of training in coördination, originally advanced by Fraenkel and subsequently developed and amplified by Foerster, to which Dr. Swift again calls attention.

The Fraenkel exercises are clearly based upon a perfectly logical conception of the nature of ataxia as essentially a loss or impairment of coördination. It is apparent, therefore, that any means capable of redeveloping or reëducating coördination becomes an entirely rational method of treatment. Experience demonstrates both its rationality and its practicability. It is quite possible to use these exercises, perhaps in somewhat modified form, in hospital outpatient departments and with unquestionable benefit to the patients, both as regards their general morale and also their actual capacity to coördinate their movements in more orderly fashion. It is possible, as suggested by Dr. Swift, that the Fraenkel movements lay unnecessary stress upon coördination in the lying position. Foerster, on the other hand, has placed chief emphasis upon the education of equilibrium, and is of the opinion that, other things being equal, walking exercises and others in the erect position lead more quickly to the desired end. In this connection it should be remembered that Fraenkel also insisted upon walking, but only after a somewhat perfect coördination in the less exacting reclining position had been secured.

The suggestions made by Foerster and approved by Swift are, undoubtedly, of great practical importance in the treatment of this condition, and, other things being equal, it is important to bear in mind that methods which lead to the most direct results are desirable. As a matter of fact, the theories of Fraenkel and Foerster are the same in principle and are supplementary to each other. The important point is that both lay stress upon the necessity of training and coördination as a distinct method of treatment in one of the most distressing conditions of the disease. It is well to bear this in mind, as suggested before, in view of the possible overenthusiastic claims of salvarsan in the treatment of a disease which, if well developed, demands all the resources of our therapeutic art.

THE IMMEDIATE TREATMENT OF A CASE OF INFANTILE PARALYSIS.

In the *British Medical Journal* of January 9, 1915, MacKenzie says that the treatment for any paralyzed muscle is immediate rest; but that alone is not sufficient —it must not only be immediate, but also anatomical.

It must be immediate, because the disease at once destroys muscle adjustments; and so fine are these that immediately the nerve cell governing the action of a flexor, for example, is affected, its extensor opponent begins to overact, and this overaction must be prevented for three reasons:

1. It does not allow complete rest of the affected anterior horn cell, being a constant source of irritation.

2. By overstretching the affected muscle it interferes with its recovery.

3. Even though the nerve cell and affected muscle may recover their power, deformity is inevitably produced, interfering with future utility—for example, recovered extensors of leg unable to act owing to a talipes equinus due to a contracted tendo Achillis.

The rest must also be anatomical because, as the writer stated in the *Australasian Medical Journal* (June, 1911): "Since rest is the basic treatment of inflammation, only by the zero or anatomical position can the door be closed on all sources of irritation, and cord, nerve, receptive substance, and

muscle be placed at physiological rest; that is, only through the zero position can you offer the greatest physiological opposition to the source of inflammation."

A muscle is rested only when it is placed in a position in which its work is zero and its origin and insertion are as nearly as possible on the same horizontal plane, for the resumption of function, which should be gradual, is always easiest along a straight line. The zero position is the position of anatomical rest in which the individual muscle itself is relaxed, and both its own action and that of its opponent prevented.

MacKenzie's practice when reëducating a muscle is to begin each day at zero, and gradually to work up to and beyond the highest point achieved the day before. If, for example, the knee be contracted owing to a paralyzed quadriceps and overacting flexors, it is obvious that the former being at a disadvantage for functionating, equilibrium has been destroyed. Hence he places the quadriceps in a position of relaxation (knee extension), prevents the overaction of its opponent when resting by means of a splint, or when exercising by means of position, then daily works at it to restore the lost equilibrium, by recognizing that it is incorrect to flex the knee beyond the point from which extension is possible—that is, at which effort becomes manifest—thus recognizing the cessation of its opposition to its opponent flexor.

There is relatively a much higher organization and specialization of the upper limb with an enormously greater correlation with intellectuality and natural and acquired skill. The upper limb of a man, with its fine intrinsic and extrinsic adjustments, is in marked contrast to that of Macropus, in which, in spite of a dependent forelimb, we have defective muscle development and absence of a pollex. In man, so even is the adjustment that the loss of function of the adductor pollicis or pronator teres or supinator brevis may be sufficient to ruin the utility of the upper limb. Furthermore, the more tendinous the muscle the less its power of recovery, and the less the utility of a muscle or its importance in the animal economy the greater the liability to affection.

For the upper limb the anatomical position is as follows: The thumb is adducted because opposition to the fingers is essential, fingers slightly flexed, wrist slightly dorsiflexed on account of the grip, hand placed midway betwen pronation and supination, elbow slightly flexed to relieve the biceps and brachialis anticus, and the arm abducted to a right angle, or even higher, to help the flexors, deltoid, and trapezius. The biceps is not rested by mere flexion, for the long head crosses the shoulder-joint; and not only should we have flexion of the forearm, but the arm raised as in deltoid cases. In other words, to speak of relaxing a biceps by means of a sling—that is, by merely flexing the forearm—is anatomically unsound.

MacKenzie effects rest by means of a special arm splint introduced some six years ago, and simple both in its construction and application. The basis of the splint is a stem of malleable iron ½ inch wide by ¾ inch thick. This runs up the midaxillary line from the costal edge to the axilla, and follows the contour of the under surface of the arm and forearm to wrist, being bent to the requisite angle at the axilla and elbow. A piece of aluminum or tin shaped to the hand is attached at the wrist to allow of the median position above stated, and the fingers rest on a pad of wool. Wings ½ inch by 1/16 inch are attached at wrist, elbow, and upper arm, and two wings two-thirds round the chest; the ends, being connected by a strap and buckle, are attached to the stem, one at the costal edge and the other below the axilla. The limb is lightly bandaged on, and a piece of bandage over each shoulder from the front to back is sufficient to hold the splint well up against the axilla. If no splint be at hand, nevertheless the limb must be placed at rest by some simple appliance—as, for example, with the child lying in bed, one pillow can be placed in the axilla, and, with the limb resting on another pillow, safety-pins attach the sleeve of dress to it at arm and wrist so that the limb is abducted, elbow flexed, and brachial plexus rested.

As regards the lower limb, it is important to remember that not only is it a question of muscular movement but also of the support of the superincumbent body weight. The great point in beginning treatment is the relation of the two anterior superior spines to the umbilicus; the spines should be on the level; the feet should be at right angles to the leg, and possible inversion or eversion guarded against. If the flexors are affected with overacting extensors (an extremely rare condition), it is best to flex the foot in the equinus position. The knee should be extended, as the quadriceps is the great muscle for the erect posture, but one must be careful not to overstretch the flexors, so it is best also to apply a slight cushion of wool under the knee. The hip should be slightly flexed to rest the iliopsoas muscle. It is a good rule at the outset, if only one limb is affected, to rest the two until the paralyzed one has recovered, as pelvic tilting, the result of overaction of one side, may easily occur, and, once having occurred, is never overcome. It is also difficult to make quite sure at the beginning whether the abdominal muscles are affected, but if the two spines are on a level tilting will never occur. Furthermore, only in this way can we prevent undue rotation of the hip, either external or internal, and especially the former, to which there is so great a tendency.

This may be effected in various ways: A double Thomas splint, with slight flexion at hip, or the lower part of a Thomas, namely, from the thigh wings to the leg wings, and a cross-bar; or simplest of all, a piece of padded board behind each knee from the middle of thigh to middle of leg and a connecting piece across the middle, a pillow under the feet allowing flexion at the thigh. As regards the feet, trouble is likely to arise from deformity even after the first day, and this is largely due to the fact that lateral movements are not prevented. The ordinary foot-piece on a back splint is insufficient. A tin splint lined with chamois and extending to upper third of leg is best. The leg-piece extends half round the circumference of the leg, and the foot-piece has its edges turned up for 1 inch on the inside and ¾ inch on the outside, thus forming lateral shields to keep the foot in position. By means of pieces of webbing and buckle suitably applied the foot can be held in perfect position. Immediate attention to this detail will repay us. If one has nothing at hand a pillow can be kept against the foot to maintain the right-angled position. If, in addition to the limbs, the muscles of the neck and back are affected, a double Thomas splint with head extension is best, but the point to remember is that these muscles, as a rule, recover spontaneously. MacKenzie's firm belief is that if cases of infantile paralysis were only regarded most seriously at the outset—on the level, say, of a gangrenous appendix—and not left until something developed, not only would subsequent treatment be rendered comparatively easy, but the splints might act prophylactically and actually abort an oncoming paralysis.

THE REACTION OF COW'S MILK MODIFIED FOR INFANT FEEDING.

The *Journal of Medical Research* for January, 1915, contains an article on this topic by CLARK in which he reaches the following conclusions:

The addition of alkalies to modified milk for the purpose of neutralizing "the high acidity of cow's milk" is shown to be a practice based upon wrong principles.

The addition of alkalies to modified milk for the purpose of preventing firm clots in the infant stomach is shown to be a procedure which not only may be unnecessary, but one which involves a possible inhibition of both gastric proteolysis and lipolysis.

Finally, the addition of alkalies to modified milk is criticized because of its probable influence in displacing from the intestine a normal bacterial fermentation and replacing it with those proteolytic or "putrefactive" processes which are responsible for many of the digestive disorders of infancy.

TREATMENT OF SYPHILIS.

STIMPSON, assistant surgeon-general, U. S. P. H. Service, in a bulletin of the government printing office, 1915, gives us the following interesting facts:

Lieut.-Col. Gibbard and Major Harrison, of the British army, have compiled the following table from the records of the war office:

TREATMENT.	Total cases.	Average number of days in hospital on first admission.	Clinical Relapses.					Average time lost by each man in days.		
			Once only.	Twice only.	Three or more times.	Total number which relapsed.	Percentage of clinical relapses.	In hospital.	Attending as an out-patient.	Total.
Mercury alone	371	42.0	151	115	49	315	83.0	66.2	17.6	83.8
Mercury and salvarsan	152	23.2	6	0	0	6	3.9	25.2	15.8	41.0

The special points to which they draw attention in this table are: (1) The very marked reduction in the number of clinical relapses shown by the salvarsan as compared with the exclusively mercurial cases; and (2) the great reduction in the average number of days lost by each soldier, especially in hospital. It will be seen that the salvarsan cases spent an average of 41 days less in hospital during the first year than the exclusively mercurial. Considering that about 2000 fresh cases of syphilis are admitted every year to army hospitals, one may reasonably expect that without any improvement on present methods the routine use of salvarsan will effect a total annual saving of between 70,000 and 80,000 hospital days. At present the total number of admissions for syphilis to British army hospitals yearly is about 4000, but only half of these are fresh cases. On the basis of this table the routine treatment of syphilis with salvarsan and mercury will reduce the number of relapses so much that the total admissions to hospitals for syphilis should be reduced from over 4000 to about 2300.

The non-effective rate in the United States army—that is, the number of men per 1000 who are constantly sick with syphilis—was 1.70 in 1912, whereas in 1906 it was 2.98. The discharge rate—the number per 1000 discharged during the year on account of physical disability resulting from syphilis—was, in 1912, 0.61; in 1906, 2.79. The discharge for this cause in 1900 was 5.46. These men were discharged on account of failure of treatment to restore them to health. The superiority of present-day treatment of syphilis is manifest. Major Patterson writes:

"In the presalvarsan days it was common for men to be in hospitals for from two to five months before it was considered safe to return them to duty while continuing treatment. Now a course of treatment covering six to nine months need not necessarily deprive the government of the soldier's services, by admitting him to hospital for more than 15 to 25 days—a great saving of time to the government. Furthermore, it is believed to have been proven beyond doubt that the combination of the old standard remedies plus salvarsan, or preferably neosalvarsan, which is easier of administration, is the quickest and most effectual way to cure syphilis in all its forms."

All venereal sores should be carefully examined for the presence of spirochæta pallida. If the lesions are syphilitic, these organisms can be found in three-quarters of the cases by the dark-field microscope in a few minutes. This examination should never be neglected, as the disease can often be aborted by early treatment. If dark-field illumination is not available, Giemsa's stain should be used. The Wassermann reaction cannot be depended upon during the first week, as Captain Craig found it positive in only 27.6 per cent of cases. As soon as the spirochæta pallida is found treatment with salvarsan and mercury should be at once begun. The plan of treatment given below is recommended by Cap-

tain Nichols, and is the one that Gemmerich employed in the primary stage with great success in the German navy.

(*a*) With negative Wassermann—that is, within a week or two of the appearance of the chancre: Two full doses of salvarsan (or neosalvarsan) with an interval of one week; one month of intensive treatment with mercury by inunctions or injections. Excision of the chancre if the location permits.

(*b*) With a positive Wassermann reaction and glandular enlargement: Three full doses of salvarsan at weekly intervals; six weeks' intensive treatment with mercury.

The blood should be tested for the Wassermann reaction in all cases in which syphilis is suspected. This reaction was found by Craig to be positive in 89.2 per cent in the primary stage; in the second stage 95.9 per cent were positive; in the tertiary stage, 87.9 per cent. Mercury should be omitted two or three weeks before the blood is tested, and the patient should not have been under the influence of alcohol for the previous three days, or otherwise the result of the test may be misleading. It is also best to use aseptic precautions in collecting the sample of blood, and the glass container in which it is sent to the laboratory should be sterilized. Treatment should be continued for some time after the reaction becomes negative, for it has been found to become positive again when the treatment was not sufficient to prevent relapse. Craig shows this in a number of his cases, of which Case 3 is given below:

October 10, 1910. Double-plus reaction.
October 18, 1910. Salvarsan, 0.6 gramme intravenously.
November 18, 1910. Minus reaction.
December 18, 1910. Minus reaction.
January 18, 1911. Double-plus reaction.
January 20, 1911. Salvarsan, 0.6 gramme intravenously.
February 20, 1911. Plus-minus reaction.
February 28, 1911. Minus reaction.
April 20, 1911. Minus reaction.
June 20, 1911. Minus reaction.
August 8, 1911. Plus reaction.
September 8, 1911. Double-plus reaction.

Some of the conclusions arrived at by Captain Craig regarding the action of salvarsan upon the Wassermann reaction in syphilis are:

"The best results as regards the disappearance of the reaction are obtained in the treatment of patients in the primary stage of syphilis, and the poorest in the treatment of those in the tertiary stage.

"The reaction, in our experience, has disappeared most frequently during the second, third, and fourth week after treatment with salvarsan.

"The reaction disappears most rapidly in patients during the primary stage.

"The prognosis, as regards the disappearance of the reaction, is most favorable in those patients giving a plus-minus reaction, and least so in those giving a double-plus reaction.

"The data would appear to indicate that at least three or four intravenous injections of salvarsan are necessary in order to cause the disappearance of the reaction in from 70 to 80 per cent of patients.

"A larger proportion of negative results were obtained in patients previously treated with mercury than in those not so treated, but the time of disappearance of the reaction was little affected.

"The great superiority of salvarsan over mercury, as a specific remedy, was shown in the rapid disappearance of the reaction, after one or two injections of the drug, in patients previously treated for one, two, or even three years with mercurials, and in whom the reaction was still positive.

"The complement fixation reaction is of the very greatest value, as a guide to treatment with either salvarsan or mercury, and, together with the luetin test, furnishes an accurate method of determining whether syphilis is actually cured by any therapeutic agent."

In some cases in which the Wassermann reaction is negative, an injection of salvarsan will convert it into a positive one. This is called a provocative Wassermann reaction, and is of great value in deciding if certain cases are syphilitic or if the treatment of other cases has been sufficient. The test may become positive as early as the second or as late as the fourteenth day.

The luetin test was discovered by Noguchi three years ago. It consists of an

emulsion made by grinding up fluid and solid cultures of spirochæta pallida, which are killed by heating to 60° C. for one hour. One-half of one per cent trikresol is added as a preservative. A drop of this emulsion diluted with an equal amount of sterile salt solution is introduced into the skin. The positive reaction may be "papular," "pustular," or "torpid." The papular form appears in one or two days as a raised, reddish, indurated area, which slowly increases in size for several days, but entirely disappears in a week. In the second form the papule undergoes softening, first changing into a vesicle and then a pustule, which breaks and dries up in a short time. In the torpid form the reaction occurs late, sometimes not for three or four weeks. This test is usually absent in the active stages of syphilis, but it is present in the majority of the tertiary and latent cases and in late syphilitic affections such as tabes dorsalis and general paralysis, in which the Wassermann reaction is often negative.

THE TREATMENT OF WOUNDS.

Writing on this topic in the *British Medical Journal* of January 9, 1915, COOPER says that the evidence in favor of using pure carbolic acid for the immediate disinfection of, as a preventive, lacerated wounds amongst the soldiers at the front, both against tetanus and severe sepsis, steadily accumulates. Tincture of iodine has proved a broken reed. Carbolic acid has not only stood the test as a preventive, but has been shown to have curative properties against tetanus. The objection to diluted carbolic acid, even when mixed with double cyanide of zinc and mercury, is that it cannot be relied upon to destroy tetanus spores which abound in the soil of Flanders. The so-called "escharotic" properties of liquid phenol are, to the writer's mind, inconsiderable and are easily outweighed by its other valuable properties, not least of which is its analgesic power.

The practical question is, How can the application of phenol to wounds be carried out actually in the field or trench? The protected swabs which the writer described in a recent issue of the *British Medical Journal* seemed simple enough, but perhaps even a less cumbersome plan may be the clothed glass capsule idea as advocated by Dr. Campbell Highet for a weaker antiseptic solution. The writer would, however, suggest that in order to avoid soiling the fingers with the acid (which should be kept as much as possible from contact with the skin) one end of the gauze cover surrounding the glass capsule of pure carbolic acid should be secured to a small wooden skewer, which would serve as a "handle" to the swab. The glass capsule would be broken inside its gauze cover before removing the impervious paper outer covering, and the gauze swab, saturated with pure liquid phenol, is then ready for use.

THE USE AND ABUSE OF PITUITRIN IN OBSTETRICS.

The *American Journal of Obstetrics* for May, 1916, contains an article by NORRIS. He reminds us that pituitrin was first used in obstetric practice five years ago, and that its rapid acceptance throughout the obstetric world attests its merits.

As far as the writer's knowledge and experience has taught him, the ideal safety zone would include the following class of cases: Multiparæ, with histories of previous normal labors, in whom there are no serious cardiac, cardiovascular, or nephritic degenerative changes; the second stage of labor has begun; the presentation and mechanism are normal; the bag of waters is unruptured; the vaginal canal relaxed. One intramuscular injection of 1 Cc. of pituitrin will usually in such a case, in almost magic manner, end the labor within the hour. For the sudden and violent pains induced, ether analgesia is always employed, and to forestall the real danger of uterine relaxation within an hour after delivery a hypodermic injection of ergot aseptic is always to be given immediately after the birth of the child. It has been repeatedly stated that pituitrin is always contraindicated when labor is progressing normally,

but for the particular class of cases just described the writer believes its use is justified, even with a normally progressing labor, for the avowed purpose of shortening the hours of suffering to a very few minutes. During those minutes ether administered to the degree of producing temporary unconsciousness at each recurring pain will produce amnesia, prevent nerve exhaustion, and relieve pain. This method for multiparæ some of the writer's patients have designated the "afternoon" or "midday jag," which they say, and the writer believes, is far superior to "twilight sleep." The only inconvenience observed from this method is an occasional increase in after-pains, the inconvenience of which the patient endures when such pains are explained as "blessings in disguise" to prevent undue bleeding and promote involution. Codeine or morphine in small repeated doses throughout a day will relieve the after-pains if extreme.

The danger zone of pituitrin in obstetric practice must be approached with more circumspection and requires more detailed study. The gravidity of the patient, the condition of the uterine muscle, especially of its lower segment, and of the cervix and the vagina; the history of prior Cæsarian section; the presentation and position (whether face, brow, shoulder, twins, breech, arrested posterior position), and a study of the mechanism and its progress; the size and shape of the pelvis; the presence of tumor or placenta previa, hydrocephalus or monster; knowledge of the patient's general condition that would be jeopardized by a rise, even for a short period, of her blood-pressure, such as toxemia, myocarditis, arteriosclerosis, or grave nephritis—all these factors in obstetric diagnosis should be known and appreciated and may render the use of pituitrin a highly dangerous addition to the careless or fearless obstetrician's equipment. Some of the conditions just enumerated occupy border-line positions of danger and deservedly require further discussion. For examples—the full or half initial dose to primiparæ; the desirability of using pituitrin in preference to forceps in posterior positions, or when there is minor degree of pelvic disproportion, to insure molding and adaptation before difficult forceps deliveries; its use in certain types of placenta previa, and even in eclampsia.

The most serious contraindications, to the writer's mind, are mechanical obstacles to labor and an undilated and unyielding cervix. For the former the slow adaptation and molding under nature's unaided guidance provides safety not to be obtained by the sometimes unexpected violent and tumultuous action of pituitrin. While it is true that the mechanical dilator has taught us that the danger of lacerating a cervix is greatest when the dilatation is at the last stages, pituitrin in the earlier stages finds a mechanical obstacle in the cervix, and its greatest danger then is to the child and the placenta. It has been the writer's practice never to give more than half-doses to primiparæ prior to the complete dilatation of the cervix, and when moderate disporportion exists the slow, skilled use of forceps is preferred. It has been claimed that pituitrin, by reducing the frequency of forceps deliveries, has won a triumph in thus avoiding shock, injury to the child's head, and serious injuries to the soft tissues; by diminishing the risk of infection and saving hours of suffering. In difficult forceps its preliminary use has rendered the operation easier through better adaptation and engagement of the head. These arguments hold good for multiparæ, and for primiparæ after satisfactory dilatation of the birth canal, in whom inertia has developed and the indications for forceps are present. The same obstetric judgment required for the timely forceps delivery will often choose pituitrin with advantage to the patient. The glamour of pituitrin, however, should not make us act too soon. Let us always remember that in the group of cases with slight mechanical obstacle uterine inertia is the indication for pituitrin as it is for forceps. To correct abnormal mechanisms, the value of vigorous uterine action is well known, and pituitrin again finds a valuable field in posterior positions of the occiput delayed at the inlet or to assist anterior rotation of the occiput or face. The

inertia of breech or twin labors or when there is hydramnios furnishes other important uses for this agent. Its value in placenta previa after bag insertion or version is questioned, and its careful use in half doses after the bougie has evoked pains in induced labors has certainly been of advantage in the writer's experience. A very large proportion of multiparæ at term can be safely thrown into active labor by manual dilatation of the cervix to incite pains which will persist and grow stronger rapidly under a full dose of pituitrin. After the effect of this dose has worn away, in one to three hours, the cervix is fully opened and a second dose will rapidly terminate the labor. For the control of postpartum bleeding and to promote uterine contraction during Cæsarian section the writer's experience has taught him not to rely upon it alone but to always combine it with ergot, for he has had several experiences that make him believe the dose of pituitrin, while acting much more quickly than ergot, loses its effect more promptly and gives one a false sense of security that sometimes offers a rude awakening when the ergot is omitted.

The possible danger of administering pituitrin, when grave structural changes in important organs have resulted from such diseases as myocarditis, arterial sclerosis, chronic nephritis, and profound toxemia with or without eclampsia, have not been definitely determined by experience. Until our knowledge is greater these diseases had better be classed in the danger zone.

Effects upon the Infant.—Slowing of the fetal pulse is observed, after the mother has exhibited the signs of absorption of pituitrin. Before the effects upon the mother have begun to wane the fetal heart-beat resumes its normal rhythm. At birth the infant is sometimes pale, and there may be evidence of meconium discharges. These effects, probably due to the action of the drug upon the cutaneous circulation and upon the muscular coat of the intestines, are more likely to appear when the dosage has been excessive, either in size or frequency. In the writer's experience they have not been observed when the total dosage has not exceeded 2 Cc. and the interval between doses has not been less than two hours. The relation between fetal asphyxia and violent and prolonged action and overdosage with pituitrin is one to be borne in mind. The writer has credited his experience of freedom from asphyxia to the facts of careful dosage and the invariable use of ether with the onset of vigorous, prolonged contractions. Ether apparently checks the tumultuous character of the contractions and at the same time relieves the extreme suffering.

The danger of detachment of the placenta, following violent and prolonged uterine contractions, in the earlier stages of labor must be a real danger. Such cases have been reported.

Dosage.—The efficiency of the various preparations seems to be increasing with proper standardization. Pituitrin in 1-Cc. ampoules has with very few exceptions been efficient. It should not be used after the date specified on the container.

The tumultuous action sometimes observed from a full dose, whether due to the patient's susceptibility or to the failure in standardizing the particular dose, has made the use of a full initial dose in primiparæ infrequent in the writer's hands. The first dose usually shows more marked effect upon the uterus than it does upon blood-pressure, unless there is an interval of three or more hours between doses.

If pituitrin were dispensed in doses equivalent to half the present size, its usefulness would not be diminished; its dangers would be lessened.

An analysis of 106 cases in private practice offers the following facts:

(*a*) Primiparæ, 40 per cent of the cases; multiparæ, 60 per cent of the cases.

(*b*) Administered in the first stage, 40 per cent; second stage, 34 per cent; first and second stages, 26 per cent.

(*c*) Before dilatation of cervix, never more than ½ Cc. to primiparæ. After dilatation the dose was occasionally 1 Cc. To multiparæ with yielding or fully dilated cervices, the dose was always 1 Cc.. The maximum dose to any case was 3½ Cc. in four doses.

(*d*) *Relation to Forceps.*—Thirty per cent of all cases to which pituitrin was administered were delivered with forceps—*i.e.*, it was successful in 70 per cent of the forceps deliveries; 85 per cent were in primiparæ; 15 per cent in multiparæ.

(*e*) *Duration of Labor after Administration of Pituitrin.*—In multiparæ, when the drug proved efficient, delivery occurred within an average of one hour and eight minutes; in primiparæ, three hours and eighteen minutes after the last dose. In 70 per cent of primiparæ who had received from one to four doses (sometimes half-doses, always full doses after the cervix was dilated), the forceps was required to end the labor. This study verifies the experience of others that the first dose very often is the most efficient, and that the value of pituitrin is greater in multiparæ.

(*f*) *Its Value to Fortify the Pains of Induced Labor.*—Primiparæ, labor induced with rectal tube: After the pains had begun the action of pituitrin seldom failed to hasten the onset of active labor. Multiparæ, at term, after castor oil (ounces ij) and manual dilatation and gentle separation of the lower pole of the sac: The dilatation was kept up intermittently for ten to thirty minutes, until pains were thereby regularly brought on. Pituitrin, assisted by dilatation, promptly brings on labor and often speedily ends labor within an average of three or four hours, following a single dose. A repeated dose, after an hour or two, will then rapidly end the labor.

Relation to Lacerations.—Labor in multiparæ, the final stage being conducted under ether and with counter-pressure upon the head to resist precipitate delivery through the vulvar ring, has not been followed by a greater proportion of lacerations than is usual without pituitrin. In primiparæ, having voided full doses, the increased number of lacerations that are said to occur were not observed.

Hemorrhage.—Four cases of free bleeding were noted: one of alarming hemorrhage required packings, and in one case of Cæsarian section its use without the association of ergot caused collapse from hemorrhage, requiring intravenous transfusion of salt solution. Ergot should always be used to reënforce the action of pituitrin to prevent and control hemorrhage.

Asphyxia.—In none of the cases was gross asphyxia noted. None of the infants perished. There was no maternal mortality.

From these experiences the following pituitrin aphorisms are drawn:

1. Never use pituitrin without exhausting your abilities in obstetric diagnosis.

2. Healthy multiparæ with relaxed birth canals offer the widest and safest fields for its use.

3. For inertia in the early stage of labor, the sleep of morphine, chloral, or scopolamine is preferred; in the advanced stages of labor pituitrin will often wisely keep your forceps innocuous.

4. Ether hilarity and quick pituitrin labor in multiparæ is a good practical substitute for "twilight sleep."

5. The uterus, after pituitrin's tumultuous visitation, usually needs the steadying hand of ergot.

6. Half-doses are more often to be employed than full doses.

SOME SATISFACTORY METHODS OF TREATMENT IN THE DISEASES OF CHILDREN.

The *Saint Paul Medical Journal* for April, 1915, contains an article by SEDGWICK in the course of which he states that strychnine is a rather unsatisfactory and somewhat dangerous stimulant for infants. In order to get its full effect upon the heart it is necessary to push it to the physiologic limit. Camphor, however, is prompt in action and safe. It can be given in almost the adult dose. It may be used hypodermically, and a ten-per-cent solution in olive oil of from 7 to 15 minims given at a dose, especially if the infant's pulse goes above 160.

In the severe diarrheas and in vomiting, the loss of fluids often becomes a very serious factor. The drop method of enteroclysis, 30 to 40 drops a minute, two hours on and one hour off, frequently gives

marked relief. The Hess method, in which a nipple is attached to a dropping apparatus and the baby allowed to suck it, may also be tried.

Cystopyelitis in female infants is probably the most commonly overlooked condition with which one has to deal. There is no doubt of the value of hexamethylenamine, especially when the urine is kept acid by combining it with some other preparation, such as sodium benzoate. Equally or more important, however, in the treatment is the washing out of the bladder. It is rarely necessary to wash the infant's bladder by means of the catheter. Large amounts of water given by mouth accomplish the same results. Infants with whom there is difficulty in getting them to take sufficient fluid are often markedly benefited by the introduction of water by the stomach-tube three or four times a day. It is not known by some that the passage of a tube into the child's stomach, say a No. 15 catheter, is much simpler than the similar procedure with the adult.

Convulsions in young children are usually due to spasmophilia, which is a condition of heightened excitability of the nervous system most common in early childhood and infancy, and is characterized by heightened response of the peripheral nerves to galvanic and mechanical stimulation with the tendency to tonic and clonic convulsions. Its most common manifestations are convulsions, laryngospasm, tetany, spasmodic asthma, Chvostek's phenomenon —that is, a contraction of the facial muscles when the face is tapped over the course of the seventh nerve; Trousseau's phenomenon—that is, tetany of the hand elicited by constriction of the arm; spasms of the sphincters, and various other spasms of the involuntary muscles. Spasmophilia may be patent or active, and in early childhood an anodal or cathodal opening contraction produced by a current of less than 5 milliamperes applied over the peroneal nerve is pathognomonic. It occurs very frequently with rickets and is supposed to be dependent upon an error in the calcium metabolism. MacCallum and Voigtlin have called it a calcium diabetes.

At the time of the convulsions, chloroform is of the greatest value. Its action is, however, transitory and should be supported by rectal injection of chloral hydrate solution. Infants can be given almost the adult dose of chloral hydrate, 15 grains. A safe prescription is:

> Chloral hydratis, 1 Gm., gr. xv;
> Aquæ, q. s. ad 50 Gm., oz. ij.
>
> Misce. Signa: give from one-half to the whole contents of the bottle by rectum.

[We question this dose of chloral for an infant or even a child.—ED.]

Even chloral hydrate cannot be given continually and must be supported by medication directed to the cause. During the past two years, following the advice of Behrend, the writer has been using the chloride of calcium in large doses to accomplish this. Formerly the results with calcium chloride were unsatisfactory because the doses given were too small. Five grammes (75 grains) daily will usually lower the electrical reactions of an infant and control the convulsions and other distressing symptoms. On account of the irritating properties of calcium chloride it should be given in a 5-per-cent solution, and the writer finds it well to give it with orange juice or some other flavoring agent to disguise its very salty taste. If the child still has spasmophilia, as shown by the electrical reactions, when the calcium chloride is withdrawn the symptoms may reappear. It is here that the old prescription of Kassowitz—phosphorus, one part, in 10,000 parts of cod-liver oil—is of particular value. This preparation aids in the retention of calcium, as has been definitely shown by metabolism experiments. It may be given with the calcium chloride at first and later alone. It is unfortunate that both of these preparations are somewhat unpleasant to take, but a little ingenuity in disguising the taste will usually make it possible to continue with them for a sufficient period. In the very severe cases of spasmophilia the hypodermic injections of solutions of magnesium sulphate are of great value. The convulsions are usually promptly controlled if a dosage of 20 Cc. of an 8-per-cent solution made with freshly distilled water is

used, and this amount may be repeated from day to day if the convulsions reappear.

Salvarsan and neosalvarsan are of undoubted value in syphilis in infancy. However, mercury is still our sheet-anchor. In addition to the well-known internal and skin methods of administration, the intramuscular injections are of great value in severe cases. The writer has for years used a mixture composed of 2 per cent each of mercuric chloride, sodium chloride, and phenol, with very satisfactory results when injected into the glutei. The dosage should be so arranged that from 3 to 5 milligrammes are given at a time. One Cc. (15 minims) of this solution contains 20 milligrammes, from which the necessary volume of the fluid may be readily reckoned. This is usually given in from five- to seven-day intervals.

A REPORT OF TYPHOID PROPHYLACTIC VACCINATION IN TWO THOUSAND CASES, WITH STUDIES OF THE WIDAL REACTION.

The *Journal-Lancet* of April 1, 1915, contains an article by BURLINGAME on this most important subject, and as it is based on large experience is particularly interesting.

The writer mentions the claims which have been made, that the administration of prophylactic vaccine has aggravated tubercular conditions, and that it tends to increase the susceptibility to this disease. If a bare statement of fact, without taking time to present substantiating proofs, is permissible, it may be said, although he has observed closely, he has failed to note anything which would tend to confirm this observation.

Prophylactic vaccination against typhoid has seemed to furnish absolute protection to about two thousand persons, some of whom have undoubtedly been exposed. It has failed to cause much discomfort, and has been accompanied by no accident of any kind.

The administration of vaccine at regular intervals produces a positive or atypical Widal, usually within thirty days in about 94 per cent of the cases. This blood-reaction is quite variable, and becomes negative with comparative rapidity. Although the reaction has disappeared in the majority of cases, clinical evidence indicates that the immunity continues.

The administration of vaccine at irregular intervals appears to have the effect of retarding or inhibiting the development of blood-changes, and may or may not have influence on the degree of immunity afforded.

There is apparently some evidence in favor of adopting the ten-day interval for vaccination over the seven-day term.

ACUTE LOBAR PNEUMONIA.

The *Journal of the Medical Society of New Jersey* for April, 1915, contains an article on this theme by BROWN. His experience in observing cases of lobar pneumonia has suggested many interesting conditions, which he briefly outlines. In a mild, favorable case of pneumonia, the cardiovascular balance will be maintained at or near balance during the entire course of the disease with the exception of just before crisis, when a sharp disturbance is noted for a few hours. The relationship between the systolic and diastolic pressure is maintained as well as the cardiovascular balance and pulse-pressure. In other words, this is what he considers a normal pneumonia, and it requires, as a rule, no additional treatment, as far as the cardiovascular system is concerned. As the disease progresses, any deviation from the normal standard is noted and the necessary treatment applied. The two most distinguishing features of variations are seen in the cases of high blood-pressure with marked overloads from excessive contraction of the superficial vessels, and in this type the danger, of course, is that of acute cardiac dilatation. This class of cases presents a clinical picture of marked cyanosis, dyspnea, cold extremities, and laboring heart, and the treatment must be directed toward equalizing the pressure by dilating the peripheral circulation and moderate stimulation of the heart.

On the opposite side, one sees the cases

of underload due to a marked lowering of diastolic pressure, and this type presents a clinical picture very different from the one described above. One will notice from day to day that both systolic and diastolic pressures gradually decrease, the diastolic out of all proportion to the systolic, and with this a progressive increase in the rapidity of the pulse, until such time as the pulse-rate considerably exceeds the systolic pressure. With this we have the symptoms of dyspnea, cardiac inefficiency, etc., and the treatment must be directed toward the control of vascular pressure to prevent an acute vascular paresis.

Either of these conditions, if allowed to go on, will be followed by pulmonary edema, the first due to acute dilatation of the heart and the second due to loss of vascular tone, so that in appearance they resemble each other very closely, but in fact are due to exactly opposite physical conditions.

This suggests a practical application of treatment and it reconciles many of our divergent theories of treatment. In the first type, the use of nitroglycerin, together with digitalis, is absolutely good treatment, whereas the use of nitroglycerin in the second type would be entirely contraindicated, and if given would increase the danger of loss of control. In the second type with the use of digitalis, together with adrenalin or pituitrin, the symptoms and danger will be greatly decreased.

From the writer's observations the cases of cardiovascular paresis greatly exceed acute dilatation with pressure. Unless the early development of this condition is noted and treatment begun before the vessels dilate to an extreme, it offers a good opportunity for control. If the loss of vascular control is excessive, it is very difficult to produce a condition of tonus, and the patient will die with the evidences of running heart and pulmonary edema as a secondary complication. Severe toxic cases generally present this type of symptoms.

Consideration of the above classification will reconcile many of the divergent theories of treatment. One often hears the opinion expressed that adrenalin in the treatment of pneumonia is objectionable, whereas in fact this often covers truly the treatment of high pressure cases and ignores entirely the low pressure ones. In the same way the divergent opinions regarding the use of nitroglycerin may be reconciled, and it should be used only in the selected high-pressure cases as indicated by the predominant high systolic pressure element in the cardiovascular balance.

The writer is sure that a careful observation of pneumonias will very readily disclose the above types and will be an aid in selecting the proper plan of treatment, and also the period at which stimulation should be applied. He does not mean that all cases of pneumonia may be successfully treated, because the severe toxic forms of either type may be so excessive that even intensive treatment of the problem involved may be impossible from the outset, as it is impossible to obtain from any drug the proper therapeutic action. Nevertheless, we have the satisfaction of knowing that we have been treating the condition on a scientific basis, and it removes very largely the old uncertainty as to when stimulants should be applied or withheld.

Brown thinks the following features should be emphasized:

1. That systolic pressure is of little value in itself.

2. That high systolic pressure may simply indicate the potential power of the myocardium necessary to maintain normal balance.

3. That any endeavor to lower pressure simply because it is high may increase the symptoms of cardiac decompensation and result unfavorably to the patient.

4. That in the type of myocarditis in which there are marked changes in cardiovascular pressure within a short period of time, when under the same surroundings as to rest, etc., the possibility of sudden danger must be considered, the prognosis in these cases should be extremely guarded.

In pneumonia, a mild case going through a normal course of the disease should show practically little or no disturbance of the

cardiovascular balance. Cases of high blood-pressure with danger of acute dilatation may be readily differentiated from low pressure cases in which the danger arises from vascular paresis.

Finally, with the above classification in mind, the proper selective plan of treatment may be more accurately chosen and applied in each individual case.

THE MODERN TREATMENT OF DIABETES MELLITUS.

TYSON, in the *New York Medical Journal* of April 3, 1915, speaks in his contribution of the treatment of acidosis. The primary acetone bodies are diacetic or acetoacetic acid and beta-oxybutyric acid, from which acetone is probably formed as a secondary product. They are regarded as formed for the most part in the liver, from the lower fatty acids of which the daily metabolism is very large. To a much less degree they are formed from the amido-fatty acids. Their proper metabolism depends upon the coöperation of the carbohydrates in the food, the withdrawal of these being followed by the appearance of acetone bodies in the urine. They continue to increase considerably until the carbohydrate is added to the food. "Fats are burned in the fire of the carbohydrate" is a graphic statement, not altogether correct, but it emphasizes the fact of the dependence of acetone metabolism upon carbohydrate metabolism.

Notwithstanding one's efforts to the contrary, acetone, diacetic acid, and oxybutyric acid accumulate in the blood of many patients and become a source of danger. Fortunately there is a class of remedies which neutralize these poisons, although they are not capable of preventing their production. These are the alkalies, especially sodium bicarbonate. Very large quantities are given by some, as much as an ounce to two ounces a day. Von Noorden does not advise such large doses, but still gives more than the writer does, say half to two-thirds of an ounce in a day. Tyson seldom gives more than a drachm or a teaspoonful three times a day, but in nearly all cases in which decided acidosis is present he gives it nearly continuously. As to its mode of administration, von Noorden gives seventy-five grains the first thing in the morning, seventy-five grains just before bedtime in a glass of plain or aerated water, the remainder dissolved in a bottle of mineral water during the day, being very careful to avoid mealtimes. The writer finds that American patients can rarely bear the large doses advised to be given foreign patients. The citrates of potassium and sodium are more palatable than the carbonate and less disturbing to the stomach; somewhat larger doses are required. The latter has the advantage of being slightly laxative, and looseness of the bowels is helpful in diabetics, while constipation is harmful. In the writer's experience almost all constipated cases do badly. Magnesium and calcium may also be used, the former where there is constipation, the latter where there is diarrhea. Castor oil is a suitable aperient and may be given daily in proper doses.

It has been intimated that the stomach sometimes rebels against these large doses of soda. In such event the colon, previously well cleared out, becomes available, when the "drop enema" of Murphy may be used. In the form of three-per-cent solution, as much as forty to fifty grammes of sodium bicarbonate (one and one-third to one and two-thirds ounces) may be thus used without causing irritation. Intravenous injections are also available. Somewhat stronger solutions are used, 3.5 to 4 per cent of the sodium carbonate in the same manner as salvarsan. These latter methods are of course reserved for severer cases, when diabetic coma is threatening or actually present, when some remarkable results have followed. In the writer's experience they are, however, temporary.

In the matter of diet in the stage of incipient coma, all restrictions, except as to pure sweets, are removed. The free use of milk at this stage, six to eight ounces every two hours, is recommended by some, but von Noorden has been disappointed; if obtainable, sugar-free milk may be used. On the other hand, he avers that he has tided

over cases by an exclusive diet of oatmeal preparations. Again he advises no food, but large quantities of whisky well diluted, three to five ounces daily. He calls these days "alcohol days," and he says it is astonishing how well such quantities are borne even when the patient is not accustomed to them. It is followed by a large reduction of ketonuria, and the general condition of the patient is greatly improved. These alcoholic periods are continued one to two days until improvement sets in, when they are followed by milk and oatmeal soups. After this a gradual return is made to the diet of chronic diabetes. Now and then in a long while a case is snatched from the jaws of death under these circumstances. Other narcotics, like opium, chloroform, and ether, increase the acidosis.

As to medicines in the earlier stages of diabetes, they have not much value, still less in the later stages. Their utility has been for the most part determined empirically. They include a great many: Salicylates, antipyrin, bromides, and other nervous sedatives, veronal, opium, codeine, pantopon, jambul, and others. As in other obscure diseases, there are also many secret remedies, some of which may have a slight value, fortified by some ingredient of greater value. Why salicylates are of any use the writer does not know, but it is true that their administration is followed at times by a temporary reduction in the amount of sugar in the urine, especially in cases in which there is much muscular pain. Opium and its alkaloids, morphine, codeine, and heroin, are undoubtedly effective, probably because of their sedative effect, lowering the stimulus sent down from the central nervous system to the "sugar factory." The bromides may act similarly. On the other hand, the opiates generally constipate, and constipation is a drawback to successful treatment, while the possibility of acquiring the opium habit must always be borne in mind. Hence the writer puts them off until the last.

The writer has more than once been charged with not giving jambul the credit it deserves. One enthusiastic physician showed him a prescription, which had not only jambul but also codeine and antipyrin in each pill! He has never found it of any use when taken alone. Diet is generally associated with these secret remedies and becomes a helper.

On the other hand, he is sure arsenic is of some value in a few cases; why, he does not know. He has shown this many times by noting the reduction of sugar in the urine during its administration, and a return of the sugar when the drug is discontinued. In other cases it has been entirely without effect. Again, if a glycosuria is produced by a syphilitic brain tumor, of course iodide of potassium will reduce it; but such an affection can hardly be called diabetes mellitus. In prescribing arsenic, it is better to give doses so small that they may be kept up continuously, rather than large doses that must be interrupted by the physiological effect.

Certain mineral waters have a reputation. Such are Carlsbad, Neuenahr, Vichy, and a host of others, most of which are without effect. Those which are effecutal in a degree are alkaline, and are pretty well covered by the first three mentioned. Their operation is probably similar to that of the sodium carbonate already described. They should be freely drunk. Additional effect is doubtless produced by the diet provided at the various springs and the relaxation due to absence from the cares and responsibilities of business life.

An important measure in the treatment of diabetes is rest, especially in bad cases. Its efficiency is easily shown by urinalysis, before and after a rest of a couple of days in bed.

ACUTE PYELITIS—A CAUSE OF OBSCURE FEVER IN INFANCY.

In the *Archives of Pediatrics* for March, 1915, E. J. Wood reaches these conclusions:

1. Acute pyelitis is being frequently overlooked in infancy because of the neglect of routine microscopic urinary examinations in all cases, but especially when there is obscure fever.

2. While the condition is more frequent

in female children, still there are many cases in males which are overlooked.

3. The theory that acute pyelitis is always an ascending infection with the colon bacillus from the soiling of the vulva is losing its hold, and other sources, as infection from the colon by way of the lymphatics, are gaining ground.

4. Acute pyelitis is often primary and does not necessarily follow one of the acute infections.

5. Malaria and typhoid are often diagnosed in this condition.

6. The disease responds promptly to the use of potassium citrate through the rendering of the urine alkaline.

7. Hexamethylene preparations are most disappointing and their use is to be questioned in infancy.

NITROUS OXIDE GAS ANALGESIA IN OBSTETRICS.

LYNCH is of the belief that this will make the use of scopolamine-morphine unnecessary in the treatment of private cases. Its ease of administration and freedom from danger speak volumes for its popularity. Nor is the technique complicated or the good results limited to one man. Unlike the Freiburg method, it is adapted to work in the private home, and is devoid of its many dangers.—*Journal of the American Medical Association,* March 6, 1915.

SOME SOURCES OF ERROR IN THE DIAGNOSIS AND TREATMENT OF LOBAR PNEUMONIA IN CHILDHOOD.

Writing on this topic in the *Archives of Pediatrics* for March, 1915, FLEISCHNER says that common as the errors are in the diagnosis of pneumonia their gravity and frequency are nothing when compared with the errors that are so frequently made in the treatment of the disease. There is probably no condition in the whole category of medicine in which the axiom, "Do not interfere too much with nature," is so properly applicable as in lobar pneumonia. No one who has seen many cases of this disease, especially in consultation work, can fail to have been impressed by the vast amount of improper and interfering treatment that is constantly employed. One might with great propriety sum up the therapy of pneumonia in three words—rest, fresh air, and nourishment. The different modes and methods of treating pneumonia processes are so numerous that one finds it difficult to attack the problem in a logical way. It may perhaps be desirable to elaborate a trifle on the proper methods of treatment, and then discuss some of the things that, though frequently employed, are distressingly harmful. That rest and absolute quiet are of paramount importance in treating this disease is perfectly apparent. The harmful effects of the pneumococcus toxin on the heart muscle are so evident that the value of complete quiet cannot be overestimated. Children with lobar pneumonia should not be allowed to wait upon themselves for anything. Tact in nursing is of immense value. The tossing pneumonic child is a constant source of menace to the toxic heart. In the category of proper rest comes the question of proper sleep, and special emphasis must be laid on the necessity of obtaining sufficient sleep, even if it can only be secured by the use of drugs. Were one to choose one drug to aid in the treatment of pneumonia, he would unquestionably select opium as the most valuable therapeutic aid. Notwithstanding the fact that not only text-books, but many teachers of medicine, warn against the use of opium and its alkaloids in the treatment of pneumonic infections, no drug saves the overworked organism so effectually.

Many cases of pneumonia that would wear themselves out can be spared the ravages of delirium and sleeplessness by the use of opium in sufficient dosage. As to what constitutes sufficient dosage, one might well say, "Enough to produce the desired result."

The fresh-air treatment of lobar pneumonia has become so definitely recognized that it is now practically used everywhere. Even so, one occasionally meets cases where

the prejudice of the family against fresh air is so great that the child is deprived of one of its most potent needs.

Incidental to the anorexia accompanying the toxemia of pneumonia, only too many children suffer more from the effects of starvation than from the original disease. Here, again, tact on the part of the nurse is more than essential. Too many medical men insist upon these children receiving nothing but milk, when they are long past the age when milk appeals to them. Soft diet of any kind is easily tolerated, and it is far better to employ something that the child relishes than to force food against his will, exhausting him and proportionally lowering his resistance.

The value of catharsis in helping elimination is too apparent for discussion.

As to the question of external applications, much can be said for and much against their value. If one agrees that ice is of use in treating pneumonia in adults, there is no question that it has value in treating pneumonia in older children. The prejudice against ice in pneumonia is far from justified. It is used commonly by medical men in treating meningitis, endocarditis, appendicitis, and peritonitis. Why then should it not be used in penumonitis? In babies the reaction to ice is not particularly good; in older children, however, there is no more excellent means for reducing temperature or relieving the mental symptoms. If ice is not useful in the external treatment of pneumonia, what is? Essentially nothing. With the exception of the occasional application of light mustard pastes as an aid to the failing heart, all poultices are of paramount danger. It is difficult to realize how logical physicians can explain the use of heavy poultices and pneumonia jackets in the treatment of this disease. Granting that a child under normal conditions is breathing eighteen times to the minute with a certain weight of clothing on the chest and back, is it logical to consider that he will be benefited by doubling the weight on his chest and on his back when he is breathing thirty to sixty times a minute? To say the least, it is hardly in accord with the general plan of rest in treating an inflamed part. Too much cannot be said in deprecating the use of the kaolin pastes in this disease. Not only are they of no therapeutic value, but they are truly a source of harm and damage. The question is frequently asked, after the diagnosis is made of pneumonia, as to what the patient should have for his cough. With the exception of moderate doses of opium for the distressing cough of the concomitant pleurisy, nothing is of value. The frequent employment of so-called expectorant cough mixtures is more than deplorable in the early stages of pneumonia. There is nothing for the patient to expectorate, and the noxious substances, such as ipecac and chloride of ammonium, put into the stomach only serve to disturb the gastrointestinal tract and take away what may be left of the already markedly diminished appetite. Steam is sometimes used to lessen the irritating cough, but unless there is considerable inflammation of the larynx its value is very questionable. It has the decided disadvantage of necessitating the closing of windows during its use and for a considerable period after its use.

In no acute disease does the question of heart stimulants assume the importance that it does in pneumonic infections, and in no disease likewise is overstimulation so frequently employed. It is a grave question as to the value of any stimulant in a case in which the heart is suffering from the result of bacterial poisoning. An old, worn-out horse is never whipped, nor is it advisable to whip or overwork a worn-out heart. There is no question that in the treatment of heart complications opium again occupies a position that is secondary to no other form of medication. Oxygen, especially where the cyanosis is profound, is of unquestionable value and must be used constantly. Camphor in the form of sterilized oil seems at times to produce results, and ammonia given as the aromatic spirits also occasionally seems beneficial. If the blood-pressure were materially lowered in pneumonia adrenalin should be of value, but it is rarely lowered. Caffeine defeats

its own purpose, because it overstimulates the nervous symptoms so that the little value that the heart receives is more than counterbalanced by the irritation of the cerebrum that follows its use. Strychnine has been proven absolutely valueless. Atropine should be administered to those cases in which there is a tendency to pulmonary edema.

[Some of these statements seem to us far too dogmatic.—ED.]

RECENT WORK ON VITAMINES.

In the *Edinburgh Medical Journal* for March, 1915, WATSON-WEMYSS reminds us that there are one or two points in connection with vitamines which demand brief notice. It is said that in severe infective conditions, such as typhoid fever, a purely starchy diet is dangerous and leads to anorexia, cardiac weakness, and sometimes even to nerve degeneration. Now, enthusiasts for the vitamine theory hold that those symptoms should not be looked upon as the sequel of the infection, but as symptoms of beriberi. The same applies to postoperative cases; and in all it is emphasized that a diet rich in vitamines should be given as soon as possible. It is further stated that loss of appetite is an important early symptom of "vitamine hunger," and is of special significance when occurring in children, in chlorosis, and in convalescence. A diet poor in vitamines may lead to severe gastrointestinal disturbances—vomiting, diarrhea, and meteorism—and it is a well-known clinical fact that nervous dyspeptics often treat themselves with a diet poor in vitamines with serious results.

Lastly, we have all heard of the oatmeal treatment of diabetes, the introduction of which we owe to von Noorden of Vienna. There is no doubt that in certain cases this method of treatment is extremely beneficial, but the mode of its action is quite unknown. It is now suggested that the favorable results depend in some way on the presence of a substance of vitamine type in oatmeal, and possibly in the future an explanation may be forthcoming along these lines. In any case the relation of vitamines to disease is likely to become a factor of increasing importance in dietetics, and it is right that we should know something of the part which is played by vitamines in certain affections and of their possible relation to others, as well as of the lines along which investigations are being made.

THE TONSILS IN RELATION TO SYSTEMIC DISEASES.

In the *Journal-Lancet* of April 1, 1915, PARKER, in an article on this topic, reaches these conclusions:

1. The size of the tonsil is of negative importance.

2. A small submerged tonsil with crypts covered over may be most dangerous.

3. In recurrent tonsillitis, regardless of their size, the tonsils should be removed.

4. Tonsils should be removed from tuberculous children, even though they appear normal. The writer would also remove the tonsils from children living in a home with open tuberculosis.

5. A remnant of a tonsil left after incomplete removal when covered by a scar becomes a most dangerous focus of infection.

6. Cheesy, foul-smelling crypts should be eradicated, or good drainage established by splitting the crypts.

7. Perfectly normal-looking tonsils with no history of tonsillitis are frequently found to exude pus upon pressure.

8. Ragged, spongy tonsils are nearly always infective.

9. In all systemic infections in which diligent and competent search fails to remove other source of focal infection, the tonsils should be removed.

10. Individuals known to be sensitized to streptococci should have the tonsils removed as a prophylactic measure.

A culture taken from the interior of the tonsil after removal may be made use of for making vaccine for possible future use, which, in some cases, may be of inestimable value.

Focal infection in the tonsil should be treated by complete enucleation. There is

no physiological reason why a part of the tonsil should remain.

It is not sufficient to find one focus of infection in a given case, but most important to find all foci of infection. It is therefore necessary in many cases to cooperate with the dental surgeon, the aurist, the rhinologist, and the genito-urinary or other regional specialist. However, to the internist, pediatrist, or the family physician should fall the responsibility of coordinating these facts, dictating the necessary operations and future treatment.

NITROUS OXIDE ANALGESIA IN OBSTETRICS VERSUS SCOPOLAMINE-MORPHINE SEMINARCOSIS.

In the *Chicago Medical Record* for March, 1915, LYNCH tells us that since July, 1913, he has been using nitrous oxide gas for analgesia in his obstetric work. The method must be clearly distinguished from the deeper stages of anesthesia in obstetrics known and occasionally practiced since it was advocated by Bert in 1878, and practiced by Klikowitch in the same year. The gas is given to produce analgesia, not the deeper stages of anesthesia. Consciousness is not lost, yet there is no sensation of pain. The method is that of chloroform *a la reine* with a safe drug which acts indefinitely quicker, is not irritating, and from which recovery is almost instantaneous. Contrary to the action of chloroform and ether, gas stimulates the second-stage pains, nor does it alter their frequency nor favor postpartum hemorrhage. It is a remarkable sight to see a patient bear down most forcibly with a fairly clear consciousness but without pain. The method is applicable to any case which will be allowed to come to the second stage of labor. It is suitable for patients in the ordinary home or hospital. It is a method available for the general practitioner, as the apparatus is readily portable. There are no bad effects for mother or child. It has been a matter of remark that children delivered by Cæsarian section during gas are not anesthetized to the degree obtained under chloroform or ether. This holds equally true when gas is utilized for deep anesthesia in delivery through the natural channels.

Hitherto Lynch has started the gas when the pains are severe enough to occasion complaint. In thirty-two cases it has been used for more than two hours, frequently for more than four hours, and once for six hours without complication. Analgesia is established within a few seconds and continued only throughout each pain. The pulse is not abnormally altered nor the fetal heart influenced in any appreciable manner.

The cheapest results are obtained with any instrument which has a stop-cock permitting the admixture of gas and oxygen, and a nose-piece such as is used by dentists. At the beginning of the pain gas is turned on full and the patient told to breathe through the nose. A few rapid respirations obtain analgesia. The stage is the one just before the dilatation of the pupil. There is freedom from pain. Formerly Lynch had the patient breathe through the mouth to prevent transition to the deeper stages, but experience shows that there is a desire to go fast asleep. The nose-piece is therefore removed and placed over the mouth to better control the lever, while breathing is through both mouth and nose when the breath is caught during the pain. The gas is diluted with oxygen at this time as the admixture of air is without effect. The more uniformly the stage is maintained the more safe and successful the application. Consciousness is not lost, although it is somewhat disordered. The patient acknowledges only "light-headed" sensations.

It is perfectly feasible to maintain this stage even when the head passes over the perineum, yet progress cannot be controlled without deeper anesthesia since the gas in analgesic doses stimulates the pain. Furthermore, noises are exaggerated during the analgesia and excitement may be common at the moment of birth in primiparas. Therefore, Lynch now carries the anesthesia to deeper degree, maintaining the

proper color by the use of oxygen. The rapid advance may be thus properly retarded.

When this method is first tried there is a marked tendency to carry the anesthesia too far. Consciousness should be maintained throughout the pain, but the speech should be slow and drowsy. The patient should be quieted by assuring her she is doing splendidly. Her fears must be allayed. As soon as analgesia is obtained, the pressure should be reduced to maintain the proper level. The cost of the method is markedly influenced at this time since much gas is frequently wasted. Yet under ordinary circumstances, after some experience is acquired in the method, the cost will run from four to five dollars per hour.

Lynch is firmly of the belief that this method will supplant the use of scopolamine and morphine in the private case. It is adapted to work in the private house and carries none of the dangers of ether, chloroform, or the narcotics. The method is readily learned and the results astonishing. Finally it is a rational procedure. Painful sensations are prevented from reaching the brain.

NITROUS OXIDE GAS ANALGESIA IN OBSTETRICS.

The *Journal of the American Medical Association* of March 6, 1915, contains an article by WEBSTER in which he states that from his experience in the Presbyterian Hospital of Chicago this method is recommended as the safest and simplest method of conducting painless labor.

Its advantages are as follows:

1. The apparatus is simple, easily transported, and may be used by any practitioner.

2. Deep anesthesia is not necessary.

3. There are no ill effects to mother or child.

4. The strength of uterine contractions is not diminished, no matter how long the administration of the nitrous oxide gas is continued.

5. The administration is under control all the time, and can be stopped at any moment. This is a very decided advantage which is not possessed by any method which necessitates placing a patient under the influence of drugs administered internally.

THE EFFICIENCY OF MIXED TOXINS (COLEY) IN INOPERABLE SARCOMA.

In the *Boston Medical and Surgical Journal* of March 4, 1915, HARMER reaches these conclusions:

1. From his critical survey it seems fair to conclude that mixed toxins of streptococcus and bacillus prodigiosus (Coley) are of value in certain cases of inoperable sarcoma.

2. The treatment of primary or recurrent inoperable sarcoma with mixed toxins must be intensive. The increment of the dose and the interval between injections require some experience. This method of treatment is distressing and is never certain. His analysis has been undertaken, therefore, in the hope of ascertaining the types of case which offer reasonable expectation of benefit.

3. The institution of this treatment is unjustifiable in cases in which operative measures of reasonable safety offer possible hope for removal. A frank statement of the nature and the severity of reactions and the probability of benefit should be made to the patient or some responsible person before the treatment is undertaken.

4. Seventy-three cases after most rigorous criticism have been regarded as apparent cures.

5. The small round-cell type apparently offers the greatest expectation of benefit, followed closely by the spindle-cell type (excluding fibrosarcoma). Only a relatively small number of mixed cell type have been benefited. The use of toxins in cases with multiple melanotic growths does not seem justifiable, but their use in single melanotic growths is legitimate.

6. Regarding the tissue of origin the greatest number of apparent cures have occurred in bone sarcomata (exclusive of giant-cell cases), over 18 per cent of the total number of apparent cures, with an

equal division of round-cell and small-cell types.

7. Giant-cell cases (as defined in the text) furnish about 15 per cent of the total number of apparent cures. The records seem to justify preliminary trials of toxins in carefully chosen cases in which slowly growing tumors have ruptured more or less extensively into the soft parts rather than immediate amputation. With skilful judgment a few limbs apparently have been saved. If such treatment is practiced, the patient should understand that amputation may ultimately be necessary, and it should not be long deferred in the event of increased rapidity of growth, repeated hemorrhages, considerable absorption, or superimposed infection.

A small group on account of anatomical situation, viz., extensive involvement of the vertebræ, defy surgical eradication. These, the writer believes, should be submitted primarily to surgical attack followed immediately by toxin treatment. The records justify this practice.

8. Primary inoperable round-cell sarcomata of the cervical glands compose about 10 per cent of apparent cures.

9. Sarcomata arising from fascia and muscle, which have been apparently cured, have been situated in the lower extremity, abdominal wall, and back. They compose about 16 per cent of the total number of apparent cures. Nine out of twelve are of spindle-cell type.

10. In a small number of cases the toxins produce striking relief of pain.

THE CLASSIFICATION AND DIAGNOSIS OF DIARRHEA IN BOTTLE-FED INFANTS.

The *Boston Medical and Surgical Journal* of March 4, 1915, in an editorial note, recalls the fact that Morse gave in the *American Journal of the Medical Sciences* for January an admirable exposition of the various forms of infectious diarrhea. He divides the microörganisms which are its primary cause into three main classes: the dysentery bacillus in all its forms, the gas bacillus and similar organisms, and thirdly, other organisms, of which the most important are streptococci, the colon bacillus, and the pyocyaneus. It is impossible to determine from the symptoms what form of organism is the cause of the disease, and there is nothing about the stools which will aid in the differentiation except, in rare instances, the peculiar green color caused by the bacillus pyocyaneus, and also in cases in which the streptococcus is the cause. In the former instance the green color will disappear on the addition of nitric acid, and in the latter the streptococcus, which is usually present in large numbers, can be easily recognized by the microscope.

Morse describes a simple method by which the presence or absence of the gas bacillus may be determined in from eighteen to twenty-four hours, but very properly adds the caution that in interpreting the results of the test it should be borne in mind that the presence of a few gas bacilli does not necessarily prove that they are the cause of the disease. While it is not usually difficult to differentiate between the two, the only condition with which a typical case of infectious diarrhea is likely to be confused is intussusception, although when the temperature is high and the symptoms of cerebral irritation are marked and develop before the appearance of the characteristic stools of mucus and blood, the affection may be mistaken for some form of meningitis. Here, if from the symptoms and physical signs the diagnosis is not plain, a lumbar puncture will settle it at once. In mild cases of infectious diarrhea, however, it is not infrequently difficult, if not impossible, to distinguish between this and indigestion with fermentation, and in the diagnosis the most important single symptom is no doubt the temperature curve; for while in indigestion with fermentation the elevation of the temperature is either very slight or high, but of short duration, in infectious diarrhea, although usually not very high, it is constant and continuous. In many instances a positive diagnosis can be made only by means of a bacteriological examination of the stools, and as regards the presence or

absence of dysentery bacilli, there is unfortunately no method for determining this which does not require special media and a fairly well-equipped laboratory. Infectious diarrhea in infancy is always a serious disease, and the prognosis should, therefore, always be a guarded one.

It can readily be understood how the two forms, infectious diarrhea and intestinal indigestion, may overlap each other, as a baby with any form of indigestion is naturally more susceptible to an infection. Intestinal indigestion, however, constitutes by far the largest class of infantile diarrheas, and it is met with more constantly at all seasons than the other, which is more often seen in hot weather. The subdivisions under intestinal indigestion adopted by Dennett are made upon the practical basis of the foods previously administered, though if properly interpreted, he maintains, these have a scientific basis too. Simple intestinal indigestion is caused by feeding mixtures containing more fat, sugar, proteid or starch than the infant is capable of digesting, or by feeding these elements in a form which cannot be digested, and most infants with a diarrhea due to such trouble have a combination of fat, sugar and proteid indigestion which perhaps was originally occasioned by one of these constituents only. Indigestion caused by fat is usually due to the use of top-milks or cream, although such feedings by no means necessarily cause indigestion in all infants. Sugar indigestion is caused, of course, by giving too much sugar, and gruels when given in milk and sugar mixtures are undoubtedly a contributing factor in the causation of diarrhea in very young infants. Underfeeding includes all those cases in which sufficient food has not been given to make the infant gain, and many of these babies have a more or less severe grade of intestinal indigestion, while their "tolerance" (ability to digest and assimilate food) has been gradually reduced during the time this has lasted. Overfeeding is apt to be easier to treat if it occurs in a well-nourished child. The diagnosis of simple intestinal indigestion is not difficult. The onset is gradual and there is no fever. While the stools may vary greatly in color and consistency their odor is generally normal. There is no blood, unless this should be due to some local condition in rectum or anus, and mucus is practically always present.

The fermentative type of diarrhea is caused and aggravated by the intestinal bacteria which feed upon carbohydrates, and putrefactive diarrhea by those which feed upon protein, and the former is far more common because of the universal custom of giving a large amount of sugar to bottle-fed infants. It is easy to distinguish either of these from simple indigestion by the fact that a low grade of fever (usually from 99° to 102° F.) is present in the fermentative and putrefactive types. Much more difficulty is found in differentiating between the fermentative and the putrefactive type, a bacteriological examination of the stools not being practicable for the general practitioner. Apart from the stools, there are two main points of distinction: First, the fermentative form almost always occurs in the infant who has been fed a high sugar or starch diet, while the putrefactive is met with in infants who have been given strong milk mixtures with little or no starch in them, or in older children who are fed on a mixed diet. The second means of distinguishing between the two is the therapeutic test. A fermentative diarrhea will respond readily to a mixture made up of one-third milk and two-thirds water, the two being boiled together without sugar. In putrefactive diarrhea this treatment will be of no service, but the condition will yield to a starch diet, consisting of a thick gruel. When employing the therapeutic test Dennett states that it is usually better to give a boiled milk mixture to infants under five or six months and the gruels to those over that age, since younger infants are more liable to fermentative diarrhea and older ones to the putrefactive form. The sour odor of the stools in fermentative diarrhea is very characteristic, and the foul odor of putrefactive diarrhea (resembling that of decayed meat) is also

very helpful in the differential diagnosis. Again, the reaction of the stools in fermentative diarrhea is always acid, and the acidity usually occasions inflamed buttocks and chafing, while in putrefactive diarrhea it is always alkaline, and the skin is not apt to be irritated.

THE USE OF STRYCHNINE AND CAFFEINE AS CARDIOVASCULAR STIMULANTS IN THE ACUTE INFECTIOUS DISEASES.

In the *Archives of Internal Medicine* of March 15, 1915, NEWBURGH reaches these conclusions. First, as to strychnine:

1. Eight times out of seventeen there was no change in systolic pressure. Once it fell 10 mm. for two hours. Nine times out of seventeen there was a rise in systolic pressure. This rise was small, usually brief, often of only a few minutes' duration. It was inconstant, never to be relied on, often occurring after the first injection of a series, then falling to the original level in a short time and not recurring after subsequent injections. In no instance was the rise accompanied by improvement in the clinical condition. Only once was there a rise of more than 15 mm. In this single instance the pressure went up 26 mm. for a few minutes. In one patient the examination of the lungs caused a rise of from 20 to 30 mm., which lasted one hour; in another patient, subcutaneous injection of water caused a greater rise than 1/10 grain strychnine.

2. Nine times out of thirteen there was no effect on the diastolic pressure. Once it fell 10 mm. for forty minutes; in another case 15 mm. for one and one-half hours. Once it rose 30 mm. for fifteen minutes.

3. Eleven times out of sixteen the pulse showed no change. In no case was there a slowing which could be honestly attributed to the drug.

As to caffeine:

1. Eight out of nine times there was no effect on the systolic pressure. Once it fell 35 mm. during the period of treatment. There was not a single rise in systolic pressure as a result of administering caffeine.

2. Five out of six times there was no effect on diastolic pressure. Once it fell 10 mm. during the period of treatment.

3. Nine out of ten times there was no effect on the rate of the pulse. Once it rose 10 beats per minute during the period of administration.

4. In no instance was there a measurable change in respiration.

A few cases deserve special comment. The failure of a large dose of strychnine, gr. 1/10, to raise the pressure of a patient with tuberculous enteritis, whose systolic pressure had been 80 to 95 mm. for several weeks, was considered highly significant.

A patient with delirium tremens, a frail, small woman, received 1/10 grain strychnine every hour for six hours, and after an interval of seven hours three more doses at the rate of 1/10 grain per hour, without showing either toxic symptoms or any blood-pressure change.

Case 23 was one of typical surgical shock induced by fracture of the skull. His initial systolic pressure, which was 55 to 65 mm., was unaffected by either 1/10 grain strychnine or 5 grains of caffeine-sodio-salicylate. Nevertheless the failure of these drugs to show a pressor effect cannot be explained by assuming that the function of the vasomotor center was in abeyance, for stimulation of the peripheral nerves was followed by a prompt and lasting rise in the pressure of 30 mm. The stimulus consisted of scrubbing the wound with tincture of iodine. A similar condition was met in Case 12, in which two 1/10-grain doses of strychnine, given within an hour, had no effect on the falling blood-pressure, but physical examination was followed by a rise of 40 mm.

Newburgh concludes:

1. There is no evidence that the vasomotor apparatus is injured in the acute infectious diseases.

2. The evidence at hand does not permit us to say whether the functional activity of the myocardium is seriously impaired in the acute infectious diseases.

3. Strychnine sulphate, in medicinal doses, does not increase the output from the

heart, slow the pulse, or materially raise the blood-pressure. There is no logical basis for its use as a cardiovascular stimulant.

4. Caffeine-sodio-salicylate, in the doses employed, does not raise the blood-pressure or slow the pulse. The method does not permit the writer to say whether caffeine increased blood-flow in the cases studied.

PETROLEUM AS A HABITUAL LAXATIVE.

Ross points out in the *British Medical Journal* of March 20, 1915, that when Dr. W. Allan Jamieson published in the *British Medical Journal* of March 6 his kindly warning against the habitual use of liquid paraffin as a purgative, suggesting that it may cause cancer, the writer thinks that he must have been unaware of some investigations which have been made on this question, and which he will find briefly described in a letter to the *British Medical Journal* of July 5, 1913.

Liquid paraffin is one of the later products of the distillation of crude petroleum, whereas only the intermediate oil fractions seem to be responsible for paraffin cancer. The same rule holds in the case of coal derivatives—for example, tar, pitch, and soot, which also give rise to cancer—but it is only the lighter and middle oil fractions (especially the anthracene fraction) of the carbonization of coal that have this effect on the skin.

There is now more evidence that the auxetics in tar, pitch, and soot are the predisposing cause of pitch cancer, as shown not only by direct experiment but also from the fact that one can by the biological test for auxetics pick out those commodities which are known to predispose a tissue to cancer from a large number of those that do not. Therefore it would seem that paraffin cancer is also brought about by the auxetic principles which have been detected in the "interim oil scales" produced at the works in Scotland. Auxetics have been made to cause benign cell proliferation (which itself is a predisposition to cancer) both in men and animals; they are set free in the tissues by cell death following chronic injury, as well as being contained in or produced by all the cancer-causing commodities—for example, tobacco, manure, arsenic, etc. Auxetics have in addition been made to cause cell division in many classes of unicellular organisms besides individual tissue cells; indeed, it has recently been proved that some cells will not divide at all without the agency of an auxetic.

Liquid paraffin, on the other hand, if pure, contains no auxetic, as proved by tests. It is produced at about 360° C., whereas auxetics become volatile at 300° to 320° C. It has been extensively used internally for more than one decade by the general public, including persons of the cancer age, and there has been no flare in the incidence of intestinal cancer such as one would expect if liquid paraffin were as dangerous as tar, pitch, soot, or the middle petroleum fractions. It would seem, therefore, that this valuable purgative might be given a clean bill of health.

Unfortunately, the same cannot be said of refined paraffin oil (kerosene), which quite recently in the columns of the *British Medical Journal* has been advocated for administration in acute infective disease. It contains auxetic, and, if used, should only be prescribed for limited periods. Commercial vaselin also contains auxetic, to which its healing properties may be attributed, and the same may be said of liquor carbonis detergens. But these substances are rarely applied for long periods to such a cancerous soil as the intestinal epithelium.

Some proprietary coal-tar pills have lately appeared on the market. In the writer's opinion they should not be taken continuously by persons over the age of forty years.

Writing on the same subject Dr. G. Victor Miller says he has read with much interest, in the March 6 issue of the *British Medical Journal,* Dr. Allan Jamieson's remarks on the use of petroleum as a habitual laxative, Dr. Jamieson's opinion being that its action "is not merely that of a lubricant

oil," but also that of castor oil and croton oil, "by irritating the lining of the intestines, causing an augmented flow of mucus, and at the same time increasing peristalsis."

Dr. Eric Pritchard, in his reply to Dr. Jamieson's letter, expresses the view that pure and refined petroleum, taken internally, has little or no irritant effect on the mucous membrane of the bowel.

Dr. Miller is inclined to support Dr. Jamieson, for the following reason: Highly refined preparations of petroleum are applied to the head as a dressing and for promoting the growth of hair. It is the experience of Dr. Miller and some others he has spoken to on the matter, that the continued use of petroleum preparations (refined) to the head produces after a time small warts on the scalp, which disappear with the disuse of it. He thinks petroleum should not be given internally for long periods at a time.

TRIOXYMETHYLENE GAS IN MILITARY SURGERY.

PAUCHET and SOURDAT (*Journal de Médecine et de Chirurgie,* tome lxxxv, 19th Cahier) advocate trioxymethylene gas not only because of its ease of preparation, but because of its extraordinary efficiency in keeping wounds clean. They also use the trioxymethylene where there is reason to suspect infection in drainage tubes, sounds, bistouries, needles, scissors, etc. The preparation of gauze is very simple. It is thrown into a metal box, without any special precautions as to cleanliness, with some pastilles of trioxymethylene. The box is then closed and put in a warm place at a temperature of about 50° C. for an hour. It is used as either a dressing or packing and has given far better results than has any other method. The amputations for gangrene are practiced just above the obviously gangrenous area, the cut being carried through at the same level. The wound is left open and dressed with the trioxymethylene. A reamputation is needful, but the wounds do extremely well. If the flap operation is done, the wound is left without stitches, gauze being employed.

TUBERCULOSIS OF THE CERVICAL LYMPH NODES.

SPENCE (*Long Island Medical Journal,* January, 1915) notes that many cases of hyperplasia of the lymph nodes recover as the result of intelligent treatment of the throat, nose, and teeth. Operation offers the best means of cure when conservative and hygienic measures fail, nor need it be attended by any disfiguring scars. Indeed, it is quite true that even ill-placed incisions result in forming scars less disfiguring than does the abscess when allowed to burrow and break spontaneously.

Before deciding on the relative merits of general treatment and operative treatment in these cases it is necessary, of course, to study a sufficient number of them for a proper comparison. It is fortunate that careful observers have collected and tabulated their results. Demme, of Berne, reported the first twenty years' work in the Children's Hospital in which six hundred and ninety-two patients with lymph-node tuberculosis were treated by constitutional measures only, and of this number 29.2 per cent later developed tuberculosis in other parts of the body, 21 per cent in the lungs. Even these figures do not include the bone infections, and in many instances the period of observation was short. Statistics from some of the large German clinics show that 25 per cent of the cases not treated surgically subsequently develop pulmonary tuberculosis, about 10 per cent tuberculous meningitis, and a smaller per cent tuberculosis of the bones and joints. Von Noorden reports 28 per cent of later tuberculosis in one hundred and forty-nine patients. Blos in one hundred and sixty cases found 26 per cent of lung tuberculosis and 14 per cent tuberculosis in other organs.

On the other hand, Karweski reports a series of one hundred and twenty-eight cases in children that were operated upon and kept under observation for a long time, with only three deaths from tuberculosis, a percentage of only 2.5. Wohlgemuth reports in a series of one hundred and twenty-seven cases 24 per cent cured without operation, 63 per cent cured by incision and

curetting, and 70.5 per cent cured by extirpation. Judd reports six hundred and forty-nine patients from the Mayo clinic, all of them operated upon, in which less than 3 per cent died of pulmonary tuberculosis. Many other operators have made similar reports and are therefore strongly in favor of surgical treatment, combined, of course, with the very best of general treatment. Among American surgeons Dowd has probably followed his cases most carefully and has furnished some valuable records. In a series of two hundred and seventy-five cases he has had but one death, the fatality being the result of secondary hemorrhage.

THE ADVANTAGES OF COMBINED ANESTHESIA IN THE OPERATIVE TREATMENT OF HEMORRHOIDS.

SEFF *(American Journal of Surgery,* January, 1915) has thus employed in 16 cases a method to which he applies this term.

The preparation of the patient is the usual one of thoroughly evacuating the bowels. Three-quarters to one hour before the induction of general anesthesia, a hypodermic injection of morphine sulphate 1/6 of a grain and atropine sulphate 1/150 of a grain is given. Ether by the open drop method is the anesthetic used. The patient is never placed in the lithotomy position until well under the effects of the narcotic. The skin area about the anus is painted with a three-and-a-half-per-cent solution of tincture of iodine. Four points are selected about the circumference of the anus, one-half to three-fourths of an inch from the mucocutaneous junction, corresponding to 12, 3, 6, and 9 on the dial of a clock. A solution containing two parts of a one-half-per-cent solution of novocaine and one part of a 1/600 solution of quinine and urea hydrochloride is injected into the internal sphincter of the anus at each point. The course of the needle is guided with a finger in the rectum, so that one may be absolutely certain that the needle is in the sphincter and not in the lumen of the bowel. Almost immediately after the solution is injected the guiding finger feels the sphincter relax. After waiting a minute or two it is possible to insert the breadth of four fingers into the anal opening without any resistance whatever. Also there is no reflex contraction of the sphincter. The hemorrhoids are very readily rolled into view, by placing four Allison forceps at opposite points at the mucocutaneous junction. The hemorrhoids are thus easily exposed, and whatever method is selected for their removal can be practiced without any difficulty. The author has used the clamp and cautery method without putting either a tube or packing into the rectum. The average amount of novocaine and quinine and urea hydrochloride solution used was 15 to 20 Cc. for each case. The patients maintain a good color and breathe quietly throughout the operation. The amount of ether used in each case has been one-third to one-half the amount necessary under general anesthesia alone. In a number of the cases they have discontinued giving the anesthetic fifteen to twenty minutes before completion of the operation. On recovery from the effects of the anesthetic fifty per cent of the patients have been entirely free from postoperative pain, according to charted results. The remaining number have required but one dose of a hypnotic throughout the entire postoperative period.

The writer attributes the prolonged relaxation of the sphincter and the absence of the postoperative pain to the continued anesthetic effect of the quinine and urea hydrochloride, and furthermore, he feels assured it is this agent that blocks the impulses that cause reflex spasm of the neck of the bladder. In his entire series of cases all patients have voluntarily urinated, showing that the method eliminates the danger of infection of the bladder by catheterization.

For purposes of comparison the writer has operated on four cases for hemorrhoids under purely local analgesia, using the solution of two parts of a one-half-per-cent novocaine and one part of the 1/600 quinine and urea hydrochloride, and injecting this solution into the sphincter ani in the same

manner as with the method of combined anesthesia. Although perfect relaxation of the sphincter is obtained, and the cautery causes no pain, it is nevertheless a very tedious procedure to keep entirely within the bounds of the analgesic area. The injection into the sphincter renders the skin area analgesic only for a short distance around the mucocutaneous junction of the anus. The pain from the insertion of the needle into the sphincter is severe in itself. Only two of these four cases urinated voluntarily, and all received more than one hypodermic injection of morphine. With combined anesthesia the writer has entirely eliminated the necessity for catheterization in every case, and when a hypnotic was necessary one dose sufficed.

The disadvantages of both local analgesia and general anesthesia are entirely overcome by the combined method. The advantages of this method may be summed up as follows:

Profound anesthesia is not necessary to secure the proper relaxation of the sphincter. Untoward symptoms such as cyanosis and stertorous breathing are entirely eliminated. The amount of general anesthetic used is reduced from one-half to one-third that required under general anesthesia alone, and therefore postanesthetic general sequelæ are reduced to a minimum.

The ease with which the hemorrhoids are brought into the field of operation eliminates unnecessary manipulative trauma, and its direct and indirect complications.

Postoperative pain in fifty per cent of the patients was not present, while the pain in others was reduced, so that but one dose of a hypnotic was necessary to carry them through the entire postoperative period.

Since catheterization, even under the strictest aseptic precautions, is attended with the dangers of trauma to the urethra, infection of the bladder, and even ascending infection of the urinary tract, the removal of this danger alone establishes the great value of the combined method of anesthesia in the operative treatment for hemorrhoids.

THE KINETIC SYSTEM AND THE TREATMENT OF PERITONITIS.

CRILE *(American Journal of Obstetrics,* February, 1915) thus analyzes the phenomena of peritonitis:

As the abdomen has within it a germ-laden intestine, and as it was a part of the body that was frequently wounded in man's phylogenetic struggles with his environment, the peritoneum, perforce, through natural selection acquired a remarkable power of self-defense against the consequent infections. As an infection is most readily spread and increased by movement, immobilization is the prime requirement in overcoming an infection. Within the abdomen this immobilization is accomplished (*a*) by inhibition of the intestines; (*b*) by distention of the intestines; (*c*) by rigid and persistent contraction of the abdominal muscles; and (*d*) by the exudation of a sticky, glue-like material. The infected point in the peritoneum may therefore be completely fixed (*a*) by paralysis, (*b*) by distention, (*c*) by rigidity of the abdominal wall, and (*d*) by gluing. On account of the intestinal inhibition, digestion and absorption cease and anorexia and vomiting follow —self-protective measures which have been evolved against the danger from poisonous broken-down food.

We see, therefore, that the paralytic distention of the intestines, the muscular rigidity of the abdominal walls, the anorexia and the vomiting which accompany peritonitis, are natural adaptations for the purpose of localizing and overcoming the infection. As for the pain and tenderness, they are part of the protective mechanism and play their rôle by forcing the body to maintain a box-like rigidity of the abdominal portion.

When the abdomen is rigid it can no longer play its important respiratory rôle, and the respiratory movements are confined to the thorax—in fact, the lower thoracic movements also are inhibited since the movable ribs are fixed on the abdominal side. As the lungs are but partially filled, the respiratory rate is increased to compensate for the diminished volume of the exchanged

gases. The diminished respiratory movements of the lower chest induce vascular congestion; vascular congestion induces pleurisy and pneumonia.

The loss of water by vomiting, the diminished intake of water, and the failure of water absorption cause a rapid shrinkage of the soft parts which is especially noted in the face, while the increased blood-supply to the intestines combined with the diminished intake of water causes a rapid diminution of the pulse volume. The loss of water is followed also by a diminished volume of urine. At the same time metabolism is increased; there is an increased concentration of solids which cannot be eliminated by the kidney, handicapped as it is by the diminished urinary output. The skin in turn, therefore, is forced to attempt by increased activity to compensate for the renal insufficiency.

We see, therefore, that the characteristic phenomena of peritonitis are as natural as the phenomena of walking, running, or fighting. The increased pulse and respiratory rate and the fever are characteristic not of peritonitis alone but of all infections. They are the result of the forced conversion of potential energy into kinetic energy as a defense. This defense also is an adaptation developed in the body by natural selection, and is the means by which foreign proteins—infection products—are broken down.

If the body-wide disturbances caused by peritonitis are adaptations for defense, then we must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem, therefore, must be to discover some means by which the method of defense evolved by nature may be maintained, while at the same time the energy of the body is conserved as far as possible.

The evidence upon which we base our postulate that the excessive transformation of potential into kinetic energy is the cause of death in peritonitis points the way to the method by which the energy may be conserved:

In experimental researches Crile has found that infection produces in the brain, the suprarenals, and the liver histologic changes which are identical with the changes which are characteristic of exhaustion from any cause—running, fighting, trauma, etc. Exhaustion from any cause is invariably accompanied by wide-spread histologic changes in these three organs—the brain, the suprarenals, and the liver—these changes, according to the degree of exhaustion, varying from slight hyperchromatism through stages of chromatolysis to a final stage of disintegration.

Experimental researches have shown that deep morphinization prevents the histologic changes which are characteristic of the excessive conversion of energy—that is, of exhaustion.

Not only is the conversion of energy excessive in cases of peritonitis, but the intake of energy in the form of food fails, so that the stores of energy are depleted with great rapidity, while the action of the kinetic system is still further impaired by the loss of water equilibrium.

These facts point the way to two prime requisites in the treatment of peritonitis: (*a*) the conservation of energy by the use of morphine, and (*b*) the maintenance of the water equilibrium by the Murphy rectal drip.

Morphine not only protects the organs, but it also aids in promoting the efficiency of the defense mechanism within the abdomen—for deep morphinization of itself causes inhibition of the intestine; immobilizes the patient as a whole; prevents pain; and holds metabolism practically at a standstill. Under deep morphinization but little food is required; the brain, suprarenals, and liver are protected; and the intestines are immobilized while the phagocytes overcome the infection.

That deep opium narcotization is an efficient treatment for peritonitis was well known to the older clinicians, especially to Alonzo Clark and to Flint, who gave opium until the respirations were far below normal, as low even as ten or twelve per minute.

The appearance of these patients would

seem to indicate that they are perilously near death; in reality, they are in a condition which closely resembles hibernation, and which continues until the local immunizing forces overcome the infection.

In cases of appendicitis with spreading peritonitis the surgeon should never in the whole scheme of treatment lose sight of this prime need of protecting the kinetic system from exhaustion. The administration of morphine should, therefore, begin at once. Nitrous oxide is the inhalation anesthetic of choice, as ether by dissolving the lecithin in the phagocytes causes a weakening of the body's defense which may last from twelve to twenty-four hours—a break in the defense which may cost the life of the patient. The operation is performed under anoci-association, the local field being blocked as far as the zone of the actual infection.

Morphine is continued during and after the operation as it is required to conserve the patient's energies. Crile has employed this method in 391 cases of acute appendicitis with but two deaths.

We may define peritonitis as the adaptive phenomenon manifested by the kinetic mechanism in maintaining a defense against an infection of the peritoneum, and we find that the kinetic theory supplies a consistent explanation of the phenomena of peritonitis and also a true index to its successful treatment.

THE TEST OF THE CURE OF GONORRHEA IN THE MALE.

WOLBARST (*New York Medical Journal*, Jan. 23, 1915) concludes that no patient can be declared cured of gonorrhea unless the following tests have been carefully and repeatedly performed:

Microscopic and cultural examination of the centrifugated morning urine, as well as the washings from the irrigation of the anterior urethra.

Microscopic and cultural examination of the urethral discharge, whether spontaneous or artificial.

Microscopic and cultural examination of the massaged secretion of the prostate and seminal vesicles.

Urethroscopic examination of the anterior and posterior urethra.

Complement fixation test.

Skin reaction and hypodermic injection with gonococcus vaccine (still *sub judice*).

Should all of these tests prove negative repeatedly, we may then feel that as far as present knowledge permits the patient may be declared cured; but the physician cannot assume the full responsibility and guarantee the cure. The patient himself must assume that responsibility.

THE SIGNIFICANCE OF X-RAY EXAMINATION FOLLOWING OPERATION FOR CONGENITAL PYLORIC TUMOR.

SCUDDER (*Boston Medical and Surgical Journal*, Feb. 4, 1915) states that the chief difficulty which physicians and surgeons have in dealing with these cases of congenital stenosis of the pylorus is in making a positive diagnosis. One thing which makes the diagnosis difficult is the assumption on the part of the physician that pyloric spasm plays any part in tumor stenosis. The writer believes that pyloric spasm has nothing whatever to do with the condition of congenital stenosis of the pylorus. All variations in the degree of stenosis and the behavior of cases subsequently proved to be tumor cases may be explained without the assumption of pyloric spasm.

In these cases of congenital pyloric stenosis obstruction at the outlet of the stomach is the important fact. That obstruction in general at the pylorus may be either mechanical or physiological is generally recognized. But so far as any individual baby is concerned having a pyloric tumor, the obstruction is due to the tumor itself encroaching upon the lumen of the pylorus, and is not dependent in any way upon a spasm of the pyloric muscle. Variations in the degree of stenosis may be explained purely upon mechanical grounds, namely, upon the swelling of the mucosa, upon the encroachment of the tumor upon the lumen of the canal, and of the reduplication of the longitudinal folds of mucous membrane normally within the canal, all of which con-

ditions can be proved to be present, and none of which has to be assumed.

Anatomical variations of this sort are competent to account for that which heretofore has been explained only upon the assumption that tumor obstruction is associated with a pyloric spasm. If we can eliminate the idea of pyloric spasm from this group of tumor cases we shall go a long way toward reaching a quick diagnosis with shorter periods of experimental feeding, and consequently such tumor cases will receive proper surgical treatment at an earlier date and the lives of more babies be saved.

Richter's 11 cases are quoted, in 10 of which there was demonstrated a complete closure of the pylorus, and in each case bismuth passed through the stoma and not through the pylorus. These *x*-ray examinations were made from seven days to 3½ years following the operation of gastroenterostomy. In one case there was no tumor, but a spasm of the pylorus.

Downs has had examinations made by the *x*-ray bismuth meal of six cases of congenital stenosis of the pylorus subsequent to operation. The period of time which had elapsed from the operation to the *x*-ray examination was from four months to two years in these six cases. The pylorus remained closed.

Mitchell reports a similar case 2½ years after operation. No bismuth passed through the pylorus.

Nine of the author's cases showed the same condition, the *x*-ray examination being made from one to eight years following operation. Autopsies corroborate these findings.

The tumor alone with the mucous membrane changes is an adequate cause of the obstruction in all its phases, and it is unnecessary to imagine a pyloric spasm associated with the obstructing tumor.

The surgical treatment of these cases is without any question the only permanently effective treatment.

The postponement of the operation with the idea, now so prevalent, that the hypothetical spasm will let up and the tumor disappear and the child recover is unjustifiable.

A baby having tumor obstruction will always have tumor obstruction.

The omission of the hypothetical pyloric spasm from any consideration in these cases will result in earlier adequate surgical relief.

REVIEW OF THE SALVARSAN THERAPY OF NERVOUS AND MENTAL DISEASES.

Schwab (*Interstate Medical Journal*, January, 1915) observes that the diagnosis of cerebrospinal syphilis is just as easy or just as difficult as it was before salvarsan and its modifications were discovered, and that the treatment of the tabetic or paretic is just as difficult as it was before.

Meyer does not believe that Noguchi's discovery of the presence of spirochætæ in the cortex of paralytics need change our conception of paresis in the least, nor does he believe that their presence there constitutes any positive warrant as to the conclusion of the efficacy of the salvarsan therapy for that particular disease. Paresis is marked clinically by two positive facts: first, a progressive dementia, and then a fatal termination. Neither of these well-established facts bears any relation to the existence of a cerebrospinal syphilis, which Noguchi's findings would at first sight link together. There are two things which tend to separate them: first, the long interval of time between the initial lesion and the development of paretic symptoms, and secondly the difference in pathological lesions which are found in paresis and cerebrospinal syphilis.

Spooner, as the result of a very careful study of the effects of injection of salvarsan in 91 cases, reaches the conclusion that it is possible to treat in a satisfactory manner syphilitic diseases of the central nervous system by intravenous salvarsan in an ambulatory clinic. Small doses of the drug are necessary for this purpose, but such dosage yields results. Symptomatic improvement has resulted from thorough treatment in a high percentage of cases of tabes and in all cases of syphilis of the

central nervous system. No improvement has been noted in a few cases of central paresis under observation. There is relief of lancinating pains in tabes, and of headache in cerebral syphilis. Biological and cytological changes indicate that there is an organic basis in this symptomatic improvement. Moreover, improvement has been maintained over a long period of time —in many instances for from one to two years. The results of laboratory investigation when obtainable and the amelioration of symptoms correspond to the duration of the nervous lesion. The most pronounced successes are in those who show evidence in blood or spinal fluid of intense syphilitic infection. Persistence in its use is the key-note to success in the use of salvarsanized serum. It should be employed by those especially trained when other treatment fails in whole or in part.

As to the intradural injections of neosalvarsan, the solution used is hypertonic and made of such a concentration that each minim contains 3 mgrm. From 1 to 4 drops of the solution are injected. Of 15 patients treated two died from taboparesis, seven from tabes dorsalis, three from general paresis, and three from cerebrospinal lesions. Cases to be thus treated should be carefully selected. For the present at least this form of treatment should be restricted to those cases in which other forms of treatment have proven inefficient.

It is to be hoped that more careful selection and study of cases will prove the intradural injection of neosalvarsan a potent remedy in combating cases of cerebrospinal syphilis.

Von Zeissl has treated a thousand cases of syphilis without seeing the slightest injury to the patient, although he admits that in the literature some reports to the contrary are found. He brings out the idea that in the very early period of syphilitic infection there has been found injury to the nervous system; it is to such cases presumably that attention has been directed to account for the supposed bad effects of salvarsan.

Wechselmann holds that syphilis should be treated purely by salvarsan, and believes that by this drug syphilis can be completely cured.

Citron mentions two contraindications to the treatment of syphilis by salvarsan. One is diseased kidneys. In four of the fatal cases, three had kidney disease of one kind or another. Patients with injury of the larynx or bronchitis should not be treated by salvarsan, likewise individuals who are in a convalescent period of pneumonia, grippe, diphtheria, etc. Tuberculosis is not a contraindication.

THE WORK OF THE "CLEARING HOSPITALS."

BOWLBY (*British Medical Journal,* Dec. 19, 1914) defines a clearing hospital as one conveniently placed near the field ambulances of the different corps to which the wounded are sent as soon as possible after being injured or after their first field dressing. In actual practice this means that the men wounded in the night fighting are brought in in the morning, and those wounded in the day may either be got in during the afternoon, or else it may be necessary to wait till darkness permits of their being brought in safely.

The "clearing hospital" is essentially a "mobile unit," and must be able to move with the army at the shortest notice. Consequently, it is not equipped like a "general" hospital, for it has no tents or huts, and it has stretchers instead of beds, and no such luxuries as *x*-rays and a pathological outfit. It consists really only of a staff with a sufficient amount of surgical and medical equipment for emergencies, and is in future to be called a "casualty clearing station." The "clearing hospital" is supposed to be staffed and equipped for 200 patients.

Bowlby asks us to picture a large open space surrounded by buildings. Into this there drives a motor ambulance. The tail curtains are opened and reveal four "lying-down cases" on stretchers. These latter are swiftly and carefully slid out, and carried into a large receiving room 30 or 40

feet long. Another ambulance draws up with six or eight men who are "sitting-up cases," and these are helped out and walk into the receiving room. The clothes of the patients are all thick with mud. Ambulance follows ambulance, for the field ambulances at the front have been filled up during the night, and there has been heavy fighting again at daybreak—a common hour for attacks—and thus it has happened that on many days from 500 to 1000 or more wounded have arrived at a single clearing hospital in a single twenty-four hours.

Chest wounds are tolerably common, for now that the range is shorter, and often very short indeed, many more men are wounded by rifle bullets.

There is always in lung injuries some dyspnea at first, and the difficulty of breathing may be very great. Most men are relieved if given morphine and allowed to rest in a half-sitting position, and in twenty-four hours or less they get more comfortable. As a whole they do well, in spite of hemothorax, and wounds near the apex do better than those in the middle of the chest. Many of the latter are fatal from injury to a large vessel or to the heart. In all these chest wounds operations are to be avoided.

The abdomen is to a great extent protected in the trenches, and abdominal wounds are not as relatively common as they were in South Africa. They have, however, been more common in the recent fighting, and Bowlby has seen between 50 and 60. The conclusions of recent wars are confirmed, namely, that they should not as a rule be operated upon. The minority of those he has seen have recovered, although some of them have had such rigidity and vomiting as to make one feel sure of some peritonitis. Wounds through the upper part of the abdomen do better than those below the umbilicus, and bullets through the liver do not generally do much harm, although he has seen severe vomiting follow hemorrhage into the peritoneum, and he has seen fatalities from bleeding.

They have established a general custom of keeping all patients with thoracic and abdominal wounds in the clearing hospitals for several days before allowing them to go to Boulogne, and he feels sure the quieter they are kept the better they do. He prefers to keep them in the clearing hospital for at least five or six days if possible.

Wounds of the extremities vary immensely, of course, and while in some cases there are only small flesh wounds, in others, where the limb is not absolutely smashed by a shell fragment, the bones are powdered and the muscles extruded through huge rents in the skin. Many of the worst of them are due to shells, but by no means all.

The fighting has been practically hand to hand in and around the trenches, and huge lacerated wounds of exit, with or without fractures, are quite common and very numerous when bullets have been fired at such close quarters. Many such wounds are thought to be due to "explosive bullets" or to shells, but the explosive effects of bullets fired at very short ranges are unfortunately only too common in reality, and are well known to all who have any experience of gunshot wounds.

Injuries of blood-vessels have in many cases caused gangrene without serious bleeding, and have often necessitated amputations. The author states that it is his very strong impression that this is a much more common event with the present German pointed bullet than with the old blunt Mauser bullet of the South African war, and he is sure that the new bullet inflicts much more injury on the soft tissues than the older one. On the other hand, aneurisms and arteriovenous aneurisms, which were of frequent occurrence in South Africa, are relatively rare. He can only recall having seen six of all kinds amongst many thousand wounded. They may, perhaps, develop later.

Tetanus is probably not so common as on the Aisne, partly, perhaps, because it is a different ground and also because of the preventive inoculation. It is quite a mistake to suppose that it does not occur in bullet wounds but only complicates shell

injuries. He has seen it in slight bullet wounds as well as in serious ones. It has been treated by carbolic acid injections, by magnesuim sulphate, by antitoxin, and by chloral and potassium bromide; but early acute cases almost always die whatever treatment is adopted, and a good many chronic cases recover.

True "hospital gangrene," or "sloughing phagedena," he has neither seen nor heard of in any hospital in France. On the other hand, the "spreading gas gangrene" or "malignant edema" has attacked, at a rough guess, perhaps one-half per cent of the recent wounds of all the armies. Mr. Sidney Rowland has proved that it is due to one or other of a group of anaerobic spore-bearing organisms. It is very noticeable that it complicates wounds of the extremities only. The wounds of the head and neck, of the thorax and the abdomen, were all free from it. It occurs especially in those injuries of limbs which are followed by much interference with the circulation due to swelling and stasis, and by edema and blood extravasation, all of which also tend to produce sepsis, and which are all rare in wounds of the trunk and head, where the circulation is not materially affected. Consequently gangrene is to be prevented, to some extent at least, by avoiding all constricting bandages which lead to congestion and edema, and by opening up and washing with antiseptics wounds which seem to require it, so as to relieve tension and permit the removal of dirt, bone débris, and clothing; all such wounds require the most free drainage, and of course no such wounds are to be sutured.

There is also no doubt that if dressings are allowed to stay on too long, so that they dry and cork up the discharge, gangrene is especially likely to occur. Frequent dressings are therefore most necessary, and this is especially the case in all shell wounds, where the contusions and lacerations of the tissues are far more extensive than can be seen and are in no way limited to the obviously wounded area. The muscles and fasciæ far away from the wound may subsequently slough from the mere traumatism, and in such dead tissues the spreading gangrene is especially likely to start.

True pyemia he has never seen, and he has not heard of its occurrence in the base hospitals either, and wounds as a whole, though they have usually suppurated, have done well, when one considers the very wide-reaching and destructive effects of modern bullets and shells, the mud-covered clothes of the soldiers, and the difficulty or impossibility of helping the wounded at once when under heavy fire. The soil of a richly manured agricultural country, which is also very thickly populated, is a different matter from the sun-dried South African veldt. The one is full of septic organisms, the other is practically sterile. When many hours, or even days, have elapsed, it is evident that in such cases as these antiseptic treatment comes too late to prevent suppuration.

As regards wounds by bayonets, he has seen but three, and he has seen none caused by sword or lance. He has not seen a wound caused by a revolver bullet.

THE PREVENTION OF POSTOPERATIVE ADHESIONS IN THE PERITONEAL CAVITY.

SWEET and CHANEY (*Annals of Surgery*, March, 1915) report the results of experimental work and demonstrate that injections employed for the prevention of adhesions produce quite the contrary result. All the cases show much more adhesion than was present in the control dog.

The process underlying the formation of adhesions is a part of the process of the normal repair of all wounds of serous surfaces, consisting in the outpouring of a plastic lymph which seals the lips of the wound. The problem therefore is not the prevention of adhesions, but the limitation of adhesions; if the outpouring of this plastic lymph be entirely prevented, the wound is not sealed and the entrance of bacteria from the intestinal lumen into the peritoneal cavity is unhindered.

This problem of limiting adhesions therefore becomes the somewhat delicate prob-

lem of permitting the necessary adhesions and preventing the unnecessary ones. It does not seem that this delicate line can be drawn by the use of any chemical or physical method such as citrate or oil, and we return to the point so often reached by the surgeon, after some new idea has fostered false hopes, that all wounds of the peritoneum must heal by a process of lymph formation, which when carried too far means adhesions; therefore the only method of limiting adhesions is to limit the wounds of the peritoneum. The results of the work the authors report show that this can be done by careful technique and by covering the necessary wounds with freed or attached portions of the omentum or mesentery.

The most practical method for limiting adhesions consists in the clear understanding of the operator that the peritoneum is not a structure which can be cut and sewn, but a single layer of delicate endothelial cells; that the biologist obtains these cells for study by gently wiping the peritoneal surface with a gauze sponge, then pressing this sponge on a cover-glass; and that every wound of this layer of cells begins to heal by the fundamental process of adhesion formation—the outpouring of a plastic lymph.

THE TECHNIQUE OF CHOLECYSTECTOMY.

JUDD (*Annals of Surgery*, March, 1915) states that the two great dangers in removing the gall-bladder are hemorrhage and injury to the duct. Injury to the duct may occur from clamping off the cystic duct too closely or, more commonly, through efforts to stop bleeding from a cystic artery which has slipped while being ligated.

The operation is best accomplished from below upward. Dissection is easier and the circulation is controlled at the start. The condition of the common duct, head of the pancreas, and lymphatic glands must be known before exposing the gall-bladder.

The abdominal incision, instead of being made over the normal location of the gall-bladder, is made high and close to the middle line, usually extending to the ensiform. Through this high incision, in most cases, much of the right lobe of the liver can be rolled out by using the gall-bladder as a tractor. If the liver is adherent to the peritoneum, the adhesions should be freed before proceeding further, as the operation is much simpler if the liver can be displaced.

An assistant gently tracts on the pair of forceps which is caught in the fundus of the gall-bladder. The neck of the gall-bladder is then caught with a second pair of forceps, and this part of the gall-bladder and the cystic duct are pulled away from the surface of the liver. Considerable fat and edematous tissue may be encountered in this region, especially if there is an empyema of the gall-bladder; but this fatty tissue can be cleared away from the duct by a blunt dissection. Tracing down the cystic duct as a guide, the common duct is usually readily exposed by this traction on the neck of the gall-bladder. The neck of the gall-bladder and the lowest part of the body of the gall-bladder frequently lie alongside the cystic duct, so that when this is dissected out and pulled up the cystic duct is easily separated from the surface of the liver.

The stump of the cystic duct and the cystic artery are now ligated with one ligature of ordinary catgut. It will be noted that this is done before the gall-bladder has been entirely removed. This attached gall-bladder makes an ideal retractor, and traction on it gives good exposure for the ligation of the duct and artery. As soon as these structures are ligated the ligature is cut, and they are allowed to drop back free from the liver.

A suture is now started through the cut edges of the peritoneal folds from which the neck of the gall-bladder has been removed. This is continued upward to the edge of the liver and is made to cover as well as possible the raw surface left on the liver. The gall-bladder is removed a little at a time and then a few stitches applied. If there is oozing from the surface of the liver, one or two extra stitches may be nec-

essary, though usually a little pressure and relaxation of tension will control it.

A small cigarette drain is placed down to the cystic duct and brought out so it will lie in the fissure from which the gall-bladder was removed.

This technique does not vary in many essentials from that often described. The important step in the operation is the complete freeing of the cystic duct before it is cut. Sometimes this is difficult, though it can be done in practically every case.

TONSILLECTOMY IN CHILDREN FROM THE STANDPOINT OF THE GENERAL SURGEON.

BALFOUR *(Annals of Surgery,* March, 1915) holds that dissection properly performed will accomplish tonsillectomy in 100 per cent of cases, while any of the modified guillotine operations will prove inefficient in a varying percentage. The operation is not devoid of serious complications or even of mortality. The proper administration of the anesthetic is of major import. Absence of bleeding is due mainly to the fact that removal of the entire tonsil permits the tonsillar vessels to retract into the muscular wall of the pharynx.

As to the technique of the operation, there is much less to be said than to be acquired. The modification of the Waugh method is the one which has proved satisfactory in over 1600 cases in the Mayo clinic. The child should lie with the head free over the head of the table, which should be slightly lowered. The child's head is supported by the hands of an assistant who stands at one side of the table. At the opposite side is an assistant who aids by traction of the tongue, sponging, etc., while the operator stands at the head of the child between the two assistants.

A Whitehead mouth-gag without the tongue depressor is fixed in place. The operator's index-finger is introduced behind the posterior pillar of the tonsil, and by firm upward traction of the tonsil the anterior pillar is put on the stretch. With blunt dissecting scissors or tissue forceps the pillar is then well freed from the anterior surface of the tonsil, care being taken not to break through the capsule of the tonsil. This enables the operator, by means of the supporting finger behind, to force the tonsil well forward and to securely engage the tonsil with a tenaculum. Ordinary uterine tenacula, although they have a tendency to tear into a soft, friable tonsil, when carefully manipulated are very satisfactory for this purpose.

The tonsil, firmly held, is turned over, so to speak, to expose the posterior pillar, and this is freed usually by blunt dissection. The superior pole is now enucleated from the superior tonsillar fossa, and, in the majority of cases, the tonsil may then be rolled out of its bed without any more than blunt dissection.

This method enables the operator to actually see what he is doing, and, for this reason particularly, possesses distinct advantages as a precise and safe operation in the hands of the competent general surgeon who has acquired the technique and who appreciates the fact that the operation demands skill, care, and experience.

CLINICAL EXPERIENCES WITH PHYLACOGEN.

The *Charlotte Medical Journal* for May, 1915, contains an article by STADLINGER in which he says that the phylacogens, the latest of the biological preparations, have apparently created a distinct field for themselves in cases of arthritis. In an acute case, with the disease becoming rapidly worse, it is far more satisfactory to administer a dose of phylacogen daily or oftener with results in a few hours than to inject a vaccine at three- to five-day intervals and have to wait twenty-four to forty-eight hours at the very least for an improvement of symptoms. If one may accept the evidence of laboratory and clinical workers, a vaccine produces a negative phase which lasts for a day or two and brings about a positive phase which reaches a maximum only after the lapse of several days. With the phylacogens the cycle, while equally

pronounced, is completed in far less time, and the patient is ready for a second injection at a much shorter interval. This fact, taken alone, indicates a very valuable factor in phylacogen therapy.

There can be no doubt that the vaccines are very valuable under proper conditions, but it is only reasonable to suppose from the foregoing that their field of usefulness is more decidedly limited than that of the phylacogens.

In considering these latter products nothing is more important than an accurate diagnosis. It is no longer sufficient to make a diagnosis of acute or chronic arthritis, probably gonorrheal, or rheumatic, as the case may be. While to distinguish them is at times difficult, it can generally be accomplished by performing the complement fixation test for gonorrhea; or when for any reason this cannot be done, first the gonorrhea, then the rheumatism phylacogen must be administered, or *vice versa,* thus performing what may be termed a therapeutic test. What is true in the differential diagnosis between gonorrheal and rheumatic arthritis is equally true of the other forms of arthritis; and although it is not always so easy to distinguish them, yet such is absolutely necessary, or, at least, one must not be too hasty in ascribing failure, when it occurs, to the phylacogen *per se.*

The actual technique of administration of the phylacogen is no more difficult than that of the vaccines, or, for that matter, of that of a hypodermic injection of strychnine or morphine. This applies to subcutaneous administration. To employ the intravenous route, which is much to be preferred when indicated, a little more skill and experience is required, but it is not beyond the ability of any physician who is willing to acquire the proper method by practice and will observe careful asepsis.

A satisfactory knowledge of phylacogen dosage is also easily acquired. At one time from five to ten cubic centimeters were injected subcutaneously, the former being the primary dose; but, because of rather active and uncomfortable response on the part of the body to these relatively large doses, it is now considered advisable to begin with one or two cubic centimeters and increase daily until the maximum dose is being given.

Intravenous medication is more decisive in results, and the chill, temperature rise, increased pulse-rate, nausea, abdominal pains, etc., are more constant in appearance and more marked. Any combination of these symptoms may appear, but in the majority of instances the discomfort of the patient is more than offset by the decided benefit that follows: In the presence of a failing heart, a marked valvular lesion, arteriosclerosis or advanced nephritis, the intravenous method of medication is contraindicated and should be avoided, the physician then confining himself to the subcutaneous route and increasing the dose from day to day gradually so that prostrating reaction need not occur.

Briefly given, these are the cardinal points in phylacogen therapy. The writer has used these biological products with success, and believes, when properly used, they are very valuable indeed. They are in no sense "cure-alls," but scientific preparations that must be employed as intelligently and carefully as digitalis or opium, and the same amount of skill must be brought to bear in making a diagnosis preceding their administration.

RECENT WORK IN RADIUM, X-RAY, AND ELECTROTHERAPEUTICS.

FINZI (*Practitioner,* March, 1915) in a review of this subject alludes to the Radium Institute's second report confirming to a large extent the conclusions drawn from its first one. The report is highly important and very interesting, but in the writer's opinion its results in one class of cases fall singularly below those of other radium workers, including the writer; this is in rodent ulcer, in which, instead of getting about 95 per cent of apparent cures, the Institute gets less than 50 per cent. Another criticism of this report which the writer offers is that in mentioning the amount of emanation sent out in applicators it reports their

activity having been equal to 19 grammes of radium bromide; that is to say, if they send out the equivalent of ½ gramme of radium one day, and the same amount a week later for 38 successive weeks, they say they have sent out the equivalent of 19 grammes. It would be just as reasonable for a person using a sealed-up radium salt, which has the same effects as the emanations, but is constant in quantity, to say that if he used 100 mg. every day for a year, he had used 36,500 mg.

The Middlesex Hospital Reports contain articles of interest, ranging from studies of the influence of radium on cell-division and tumor-growth to snippy bits, such as observations on the absence of radium in healthy herrings. Lazarus-Barlow and Dunbar find that exposure of the muscle-nerve preparation of a frog to *a*-rays is accompanied by better maintenance of neuromuscular irritability than in the control. These beneficial effects are exerted on the nerves and to some extent on the muscle, not on the nerve-endings. Lazarus-Barlow and Beckton find that if minute quantities of radium are allowed to act on the ova of Ascaris megalocephala in the resting stage, cellular division subsequently proceeds at an accelerated rate. Greater quantities and more prolonged exposures retard the rate of division. *A*-, *B*- and *y*-rays all produce this effect, but the *a*-rays appear to be much more powerful. The quantities which produce the acceleration are, fortunately, millions of times smaller than those used in medical practice for local treatment. Mottram publishes an important investigation, from which he concludes that the action of the *B*- and *y*-rays produces a disturbance in normal growth both in plants and animals, and that this disturbance is more marked if the cells be in a state of active division: the dividing ova of ascaris are at least eight times as vulnerable as the resting ova. The *B*- and *y*-rays are followed by profound changes affecting the chromatin. Russ and Chambers find that rat-sarcoma, exposed *in vitro* to a certain dose of *B*-rays, will not grow upon inoculation into normal rats; that sarcoma cells which have been irradiated may remain in the animal body for sixty days before giving evidence of a growth; and that the failure of the irradiated tissue to produce a tumor does not necessarily indicate their destruction at the time of inoculation.

An important event during the year has been the introduction of the Coolidge *x*-ray tube. This is on a principle entirely different from most *x*-ray tubes, though this principle had previously been utilized unsuccessfully by Lilienfeld. The tube is exhausted to a very much higher vacuum than the ordinary *x*-ray tube—so high that, if used in the ordinary way, no current will pass through it at all. The cathode, however, consists of a spiral of tungsten, which can be heated electrically by a current passed through it from an insulated accumulator; when this is raised to a white heat, it permits of the passage of high tension current through the tube, and the spiral then gives off a quantity of electrons, which are converted by the anticathode into *x*-rays. The amount of these electrons is dependent on the heat to which the spiral is raised. In order to focus the electrons on the anticathode, the spiral is placed to a greater or less depth within a molybdenum tube. The anticathode of this tube consists of a solid mass of tungsten, and the tube cools itself by radiation of heat from this, instead of there being a water-cooling or air-cooling arrangement. The tube is run with the anticathode white-hot if required, and it is claimed that, if not too sharply focused, it will take 25 m. a. through a medium tube for an indefinite period. It is necessary to keep the glass walls of the tube cool in using these large currents by blowing air round the tube. He has now been using one of these tubes for some months, and it certainly has the advantage over the ordinary *x*-ray tubes that it is much more easy to keep the output of the tube constant, and it is possible to run a bigger current through it. The rays obtained do not seem to differ from those obtained by the older tubes. Coolidge claims that it produces homogeneous rays, but this has not been substantiated.

Pirie describes perfectly rational methods for the treatment of hyperidrosis, hypertrichosis, acne vulgaris, rodent ulcer, and other conditions. He uses one Sabouraud dose, once a month for six months, for the first two conditions with excellent results, which in the case of hyperidrosis the author confirmed. In rodent ulcer, he continues the treatment until from 6 to 12 treatments have been given after the ulcer has completely healed, or in other cases he uses one massive dose (four Sabouraud doses) and causes an acute burn, which heals soundly.

A. C. Crump mentions a new method for the examination of the esophagus. He introduces a bag of sausage-skin or goldbeater's skin, which he then fills with bismuth mixture. He also gives a couple of tablespoonfuls of the bismuth mixture to swallow outside the bag. The advantage claimed for the method is that it outlines the whole esophagus. The method will not secure adoption, for the following reasons:

A thick paste of bismuth and water outlines both the growth and esophagus without the use of any such bag.

It would be quite impossible for many patients with stricture to swallow two tablespoonfuls of mixture even without that in the bag.

It is doubtful if the bag would go through a really tight stricture.

The extraction of the bag is a very unpleasant process.

Tousey communicates a pessimistic paper, in which he issues warnings against *x*-ray screen examinations, and even against taking multiple radiograms. Tousey was unfortunately one of the early workers who suffered severely from the rays, and to such a man, it is true, fluoroscopic examinations are a source of danger, but to an uninjured worker, using properly protected apparatus and properly protecting himself, there is no danger whatever. As for taking multiple radiograms, it is obvious that there is a limit, as well as to fluoroscopy, from the patient's point of view. This danger can, to a large extent, be diminished by having the anticathode a long way from the nearest point on the patient's skin, a minimum of 15 inches being advisable. But one has often observed the fluoroscope used for unnecessarily long periods, and the tube left running after what was necessary had been observed. Had Tousey limited his warning to a denunciation of this practice, he would have been justified, but the more extended warning is not in accord with modern experience. He starves his patient for 36 hours before the examination, allowing no solid food and no milk, and then gives an ounce and a half of bismuth oxychloride in mashed potato and a glass of water. The rectum he examines with a bismuth and barium enema.

Dennis enters a plea for the more extensive use of *x*-rays to demonstrate the position and extent of fractures of the skull. While more use seems to be made of this method in this country than in Australia, there are still a large number of head injuries which are not radiographed, owing to the persistence of the superstition that a fracture of the skull cannot be shown. With a modern apparatus there is no difficulty in showing such fractures.

In electrotherapeutics the feature of the year has been a steady increase in the use of diathermic treatment, both for surgical and medical purposes, but especially the former. The electro-cardiogram too is coming into much more common use, and is becoming much better understood. Watson-Wemyss and Gunn give a description of the method of making simultaneous electro- and phono-cardiograms.

The method, apparently introduced by Beer in 1911, of treating papilloma of the bladder by the endovesical application of the high-frequency current is among the most successful ways of dealing with this disease when it is localized; either the high tension high-frequency from an Oudin resonator or the low tension current of the diathermy machine may be employed. Gehrels, who gives a good description of its use, employs the latter method, while in America the former is more in vogue. In either case the principle is the destruction

by heat of the tumor, and sparking is avoided, the heat being obtained by concentrating a large current on a small platinum electrode insulated to its tip and passed by means of an operating cystoscope. The application causes little or no pain and is made once a week; after the destruction of the growth, periodic cystoscopy is used to detect any early recurrence.

Bugbee uses the high-frequency spark to relieve vesical obstruction "from a hard fibrous prostatic ring, prostatic nodules after perineal operations, median bar obstructions, a small median lobe, and diffuse carcinoma of the prostate and vesical wall." He uses a small high-frequency coil, and applies the current by means of a long insulated steel wire passed through the cystoscope. A 1/10-inch spark is used, and the tissue is destroyed for about ¼ inch below the surface. No anesthetic is required, and the treatment is applied in several sessions. Symptoms are much relieved or cured.

Geyser recommends high-frequency currents in the treatment of tic-douloureux, and claims satisfactory results in 80 per cent of all cases. His explanation of the action is that vasomotor effects are produced.

THE MORTALITY STATISTICS OF TWO HUNDRED AND SEVENTY-SIX CASES OF ACUTE INTESTINAL OBSTRUCTION.

Deaver and Ross (*Annals of Surgery*, February, 1915) base their article upon 276 consecutive cases of intestinal obstruction admitted to the German Hospital in the ten years ending with 1913. In 156 of these cases there was strangulated hernia, generally of the inguinal variety; 97 were cases of postoperative and postinflammatory adhesions. The total mortality was 42 per cent. The mortality of 77 strangulated hernias was 26 per cent, nearly entirely due to delay in referring cases to the hospital. Of 81 postoperative adhesion cases the mortality was 49.3 per cent incident to delay in operating, which in these cases is often dependent upon difficulty in diagnosis. The average time from the first operation to the obstruction was two years and three months. The longest period intervening was twenty years. Fifty-one of the postoperative adhesions followed appendectomy, and 44 of this series had had drainage at the original appendiceal operation. Of the 51 cases 27 died. Postinflammatory adhesions were encountered 16 times; this term is used to denote new adhesions from an inflammatory or peritonitic process; of these 11 died, a mortality of 68.7 per cent. There were three cases of fecal impaction with two deaths, five of volvulus with two deaths, and 2 of intussusception in adults with one death.

A review of their cases shows that in almost every instance in spite of symptoms so plain as to be almost pathognomonic diagnosis had been tardy and reference to the surgeon and recourse to operation delayed. Prompt diagnosis and operation would reduce the mortality in acute intestinal obstruction to a mere fraction of that encountered at present.

VENTRAL HERNIA.

Bunts (*Cleveland Medical Journal*, February, 1915) observes that whilst it is undoubtedly true that the majority of traumatic herniæ are consequent upon drainage either from pus or other cause, yet a not inconsiderable number are due to errors in technique, resulting in faulty approximation of tissues, or infection of muscular or fascial sutures, or premature absorption or loosening of sutures. Postoperative herniæ following laparotomies for pelvic troubles uncomplicated by infection are not so frequent as formerly, probably due to the avoidance of the linea alba as the line of approach and the selection of a point on either side of it in preference.

Appendicitis operations in which drainage is unnecessary should practically never be followed by hernia; and even when drainage is required herniæ can usually be

avoided. Five great factors in the prevention of postoperative herniæ are:

Proper selection of site of operation.

Avoidance of unnecessary or extensive nerve injury.

Avoidance of infection.

Avoidance so far as possible of drainage.

Proper closure of the wound.

Of the 240 ventral hernias operated on by Lower and his associates the majority were found in women. Aside from the umbilical and gastric herniæ, numbering 65, the larger number were caused by appendicitis. Nearly three per cent died, four were not improved, and in two the results were doubtful. The general principles which prevailed in the operative treatment are: first, the removal of all the preëxisting scar tissue, which is best effected by elliptical incisions extending some distance on either side of the site of the hernia and scar tissue; this at the same time allows one to enter the peritoneal cavity at a safe point free from adhesions. After removal of all or most of the sac the parietal tissues are separated into their various layers and are approximated by layer sutures just as in a fresh incision. Sometimes this is not possible owing to too extensive scar formation or to the atrophy of the muscular layers of the abdominal wall, leaving only scar tissue and muscle sheath or aponeurosis. In such cases practically equally good results may be obtained by clearing away the sac, trimming the edges of the hernial ring, slitting the ends a little, if necessary, and overlapping the entire thickness of the wall, just as in the Mayo operation for umbilical hernia. The amount of overlapping must be determined by the amount of tension, for it is undoubtedly true that if the tension be too great no amount of suturing is going to prevent its ultimate giving way. But a moderate amount may be endured when assisted by proper adhesive plaster support and bandaging of the abdomen.

REVIEWS.

A Text-book of Medical Chemistry and Toxicology. By James W. Holland, A.M., M.D., ScD. Illustrated, Fourth Edition, Thoroughly Revised. W. B. Saunders Company, Philadelphia, 1915. Price $3.00.

Although Dr. Holland prepared the first edition of this book after he had been for many years a teacher of chemistry, he had kept himself so well abreast of his particular science and was so actively engaged in teaching its principles and practice that the text represented modern chemistry and toxicology in a singularly fortunate manner. Not only was its text presented in such terms that the student found it easy to assimilate, but the facts which he brought together, and those stated on his own authority, possesesd so much practical bearing as to make the reader feel that he was not going over matters which were theoretical or abstruse, but dealing with subjects which at any time might be applied to solving the various problems which were brought before him. These facts explain the appearance of a fourth edition, and also explain the fact that the book has been reprinted a number of times.

As Dr. Holland well points out, there have been many advances in medical chemistry since the first edition appeared ten years ago, and these advances have been incorporated in the text, and in certain instances some statements have been eliminated which, while not useless, were nevertheless not so important as the new material, the author fully recognizing that the late editions of a popular book often become burdened by bearing not only the text of the first edition but the additions to the later edition.

It is interesting to note that Dr. Holland's successor in the Chair of Chemistry at the Jefferson Medical College, Professor Hawk, has given assistance in the preparation of

this edition as well as other instructors in the Jefferson Medical College, namely, Messrs. Saylor and Bergeim.

A Reference Handbook of the Medical Sciences. By Various Writers. Third Edition, Completely Revised and Rewritten. Edited by Thomas Lathrop Stedman, A.M., M.D. Complete in 8 Volumes. Volume 5. Illustrated with Chromolithographs, Half-Tone and Wood Engravings. William Wood & Company, New York, 1915.

When calling attention to the fact that earlier volumes of this new third edition of what used to be called Buck's Reference Handbook of Medical Sciences had appeared we used terms of praise which were so strong that we have few left with which to characterize Volume 5. It maintains the standard of the preceding volumes of the third edition and the standard set by the first and second editions when under the able management of Dr. Buck. The present volume, besides containing quite a number of chromolithographs, has no less than 733 other illustrations. Altogether the book contains 923 pages, and in its alphabetical arrangement extends from the letters H E A to L I F. Designed to provide a complete library for a medical man, in which he could find everything relating to medicine and its allied sciences, it can be readily seen that it is quite impossible to take up any one particular topic for careful consideration in a review such as this. In practically every instance the editor has chosen his contributors in such a way that what they have written is distinctly authoritative. No less than 128 names of authors of articles in this volume, with their titles attached, are found in the opening pages, and each article of any importance is signed by the name of the contributor.

Materia Medica and Therapeutics. By J. Mitchell Bruce, M.A., M.D., F.R.C.P., and Walter J. Dilling. 10th Edition. Cassell and Company, London, 1915. Price 6s. 6d.

The first edition of Dr. Mitchell Bruce's little book appeared in May, 1884. In the years that have gone by each edition has been reprinted, sometimes more than once, and we understand that each edition has been a large one. The book, while covering more than 500 pages, is printed in such small type, so closely lined, that it can be readily put in the coat pocket. It does not attempt to deal exhaustively with the physiological action of drugs, but solely with materia medica and therapeutic application. It may be said in its sphere to lie between the quiz compend and the regular textbook, and yet so many important facts, even if briefly stated, are nevertheless expressed in a lucid and easily remembered manner that it is better by far than the average small manual prepared for students. The present edition, which has been revised in order to make it correspond with the new British Pharmacopœia of 1914, has, we presume, been largely prepared by the junior author. When we state finally that on the title-page appear the words "fifty-eighth thousand" the popularity of the book among teachers and students will be readily recognized by those who are not familiar with it.

Pathological Technique. Including Directions for the Performance of Autopsies and for Clinical Diagnosis by Laboratory Methods. By F. B. Mallory, M.D., and J. H. Wright, M.D. Sixth Edition. Revised and Enlarged. Illustrated. Philadelphia: W. B. Saunders Company, 1915. Cloth $3.00.

A new edition of this work is always welcomed, as it presents newer methods that have been tested by the authors and in their opinion are worth while. The present, sixth, edition is no exception to this rule.

The additions are chiefly along what may be called clinical methods, such as complement-fixation test for gonorrhea, Lange's colloidal gold test for syphilis of the central nervous system, complement-fixation diagnosis of echinococcus cysts, etc.

Some of the additions to tissue technique are Herxheimer's alcohol-acetone solution of fat stains, Bensley's methods for demonstrating mitochondria, Bielschowsky's silver stains for nerve and connective tissues, and methods for staining the treponema.

The bacillus of pertussis is described.

The book maintains its reputation as a handy and reliable guide for laboratory and clinical workers. A. G. E.

THE CLINICS OF JOHN B. MURPHY, M.D. W. B. Saunders Company, Philadelphia and London, February, 1915.

This volume includes Murphy's clinical talks on General Surgical Diagnosis directed particularly to intestinal fistula, with four cases; The Relation of Cancer Research to the Clinical Aspects of Cancer, by Harvey R. Gaylord; Aneurysm of the Brachial Artery; Division of the Brachial Plexus at the Level of the First Rib; Suturing of the Divided Nerve-Trunks; Mixed Round- and Spindle-cell Periosteal Sarcoma of the Right Femur; Disarticulation at the Hip; A Series of Drawings Illustrating Dr. Murphy's Method of Bone Transplantation for Non-union of the Tibia, cases of which have already been reported in the clinics; Open Reduction of a Posterior Dislocation of the Spine at the Level of the Second Lumbar Vertebra; Old Compound Fracture of the Right Malar Bone Resulting in Loss of the External Wall of the Orbit, with Outward Dislocation of the Eyeball; Unsuccessful Paraffin Injection; Successful Bone Transplantation; Ununited Birth Fracture of the Clavicle, ends Freshened and United with a Lane Plate after Invagination; Carbuncle of the Arm—Septicemia; Metastatic Pleurisy; Plastic Operation on the Thumb; Union of a Fractured Femur with Great Angular Deformity—Open Reduction and Plating—Hemorrhagic Cyst at the Fracture Site; A Talk on a Case of Gangrenous Appendicitis Operated the Previous Evening.

The book throughout is distinguished by the modernity, the comprehensive grasp, the vividness of illustration and the brilliancy of diction characteristic of Murphy. Chips from his Workship are all gems.

THE ORIGIN AND NATURE OF THE EMOTIONS. By George W. Crile, M.D. Edited by Amy F. Rowland, B.S. W. B. Saunders Company, Philadelphia and London, 1915.

This volume contains a collection of papers which have appeared and has for its dominant thought the conception that the brain, the adrenal, and the liver constantly play together; that no one of these organs can act without the coöperation of the other two, and these three organs are the only ones which show constant changes as the result of intense emotions, infection, or the action of foreign proteins; moreover, that the deterioration of these three organs caused by emotion, by exertion, or other factors is largely, if not exclusively, counteracted during sleep. To most members of the profession Crile's brilliant exposition of his now well-known and widely accepted theories has been studied in a fragmentary manner. The collection of his various addresses and papers in book form will prove most welcome, since thus is afforded an opportunity of a logical following of his arguments based on both laboratory studies and clinical experience.

STATE REGISTRATION FOR NURSES. By Louie Croft Boyd, R.N. Second Edition. W. B. Saunders Company, Philadelphia and London, 1915.

Boyd has compiled a summary of the laws of the United States governing the registration of nurses and has presented it in such shape as to furnish a mine of information for those states contemplating new legal enactments or the revision of laws already in existence, and a means of ready reference for the trained nurse in choosing her field of professional activity, whether temporary or permanent.

The great amount of material presented is carefully tabulated and arranged so as to prove immediately available for those who seek information on the subject considered. Indeed, this constitutes an invaluable work for legislator, doctor, or nurse who has to deal either directly or indirectly with State legislation.

CANCER: ITS CAUSE AND TREATMENT. By L. Duncan Bulkley, A.M., M.D. New York, Paul B. Hoeber, 1915.

Bulkley has contributed a small book dedicated to the Governors of the New York Skin and Cancer Hospital, in which he discusses the nature of cancer, its frequency and geographical distribution, its metabolism, its relation to diet and the medical treatment. Among other things he states that he has seen early cancer of the breast vanish under the continued applica-

tion of iodide of lead and Hebra's diachylon ointment of the German Pharmacopœia. He states that it is pretty definitely decided that cancer is not caused by a microörganism or parasite. He also concludes that no single remedy for cancer will probably ever be discovered, and while conceding that surgery has improved considerably the mortality relating to operative cases, he feels that the total achievements along this line are insignificant compared with the general mortality of 90 per cent in those afflicted with the disease. Indeed, he holds that surgery can never hope to lessen the morbidity of cancer. Also that the *x*-ray, radium, and caustics are in the same position as surgery, and can do relatively little more than cause to disappear lesions which have developed from causes which they cannot reach. As for prevention, he is an advocate of the simple life.

PYELOGRAPHY. By William F. Braasch, M.D. Illustrated. W. B. Saunders Company, Philadelphia and London, 1915.

This book, which the author modestly classes as a publication of a series of plates embodying many of the different outlines of the pelvis and ureters seen in routine pyelography, is of value not only to the roentgenologist, but is helpful to the surgeon and physician in his daily work. It is written with a simple, clear directness, and is rich in new knowledge bearing upon renal surgery. It is an important contribution to this branch of special work.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

As regards medical news we seem to be in much the same position as during the last month or two, since it is a negative quantity. There have been many less disabled soldiers from the front, owing no doubt to the fact that the cold is less severe and the trenches are considerably drier, comparatively few therefore being invalided for conditions other than wounds. On the other hand the authorities have apparently succeeded in preparing the large number of beds asked for in the months of January and February, and notices have appeared in the papers that no more private assistance is required. As regards the nursing for these extra beds it will apparently be chiefly undertaken by new units of the Royal Army Medical Corps who have been recently recruited. Fairly large numbers of this corps are to be seen daily marching out to the parks for training. A large number of them are obviously drawn from the class whose eyesight is not of the best, as may be seen by the high proportion wearing glasses. With reference to the supply of medical men for these various institutions, where a small number of beds are to be found the attendance will certainly be affected by the voluntary assistance of the local practitioners, and the same thing can be done to a certain extent in the larger towns where infirmaries and local hospitals have been commandeered by the War Office. It will probably be unnecessary to appoint any special medical officers over and above the staff of such institutions. For emergency work, however, a certain number of London and provincial surgeons have agreed to visit provincial centers should the exigencies of the case demand their assistance.

There was recently in one of the Sunday papers a column given over to replies of various people in answer to a question as to what circumstances in the present situation had astonished them most. The tone of the replies was naturally varied, though the subjects of the majority of them were very similar, but nobody mentioned the point which appeals to me most, namely, the enormous amount of extra work that people who are obliged to stay at home are doing without grumbling or even mention-

ing the circumstance. One of my friends, a dermatologist, has in addition to his own private and hospital work taken on the panel practice of a man in north London without any remuneration, in order to allow this said individual to join the Army Medical Department. As the practice he has undertaken is a large one and situated in a poor district, it will probably mean eight hours work a day besides his own private work, to which he will give up time between one and four o'clock in the afternoons. Large numbers of men, including medical practitioners, are doing work as special constables, thus relieving the ordinary police, of whom, I am told, a considerable number have been sent over to France in the rôle of military police. These, of course, have nothing to do with the large body of police who have joined the colors. Women too are doing their share not only by taking the place of the men, but also in the organization of various charities and in the distribution of the proceeds of these collections. It is also remarkable how very little grumbling there is when things go wrong. The other evening I was held up in a railway train between Vauxhall and Waterloo for an hour, and in a carriage full of people there was not a single one who grumbled. This increase of occupation among the general population has no doubt done a good deal for the general health, and in particular there have been many fewer cases of those conditions which may be classified under the heading of "neurosis," so much so that the people who come for opinions now have nearly always something very definitely the matter with them, and there are few who complain of vague indefinite pains for which no cause can be found. This is, of course, for the present all for the good, but there is likely to be a big reaction at the end when the war has terminated.

The darkening of the streets still continues and apparently to a more marked degree than formerly. At the same time it is quite noticeable that there is less vehicular traffic in the streets, the diminution being especially marked in the case of motor busses and taxicabs. I was told the other day that one large shop cannot get sufficient men to drive their delivery vans, and is now looking out for women who will be capable of undertaking this work. Train services throughout the country are very little disorganized, but a considerable number of fast trains have been eliminated from the ordinary time-tables. This has been done chiefly on the lines which run to the east and south coasts.

The so-called "influenza epidemic" which seems to occur from year to year in this country, actually not due to the influenza bacillus but to the pneumococcus, has this year not been particularly virulent but has taken a rather unusual form. There have, of course, been a large number of cases starting with sore throats and developing pulmonary symptoms. Last year there was an exceptional number of cases which started with very intense diarrhea and subsequently developed bronchitis or consolidation. This year the characteristic attack has been one which commenced with pharyngeal symptoms, developing slight bronchial catarrh and finishing up with a sudden and acute attack of laryngitis. Some of the cases were so severe as to suggest the necessity of tracheotomy. However, when this stage had been reached the illness diminished, and in practically every case convalescence set in, with a remarkably rapid recovery. The laryngeal symptoms only last a day or two, and during that time there is generally complete loss of voice and a considerable amount of dyspnea.

There has been a great deal of talk in the newspapers of an epidemic of cerebrospinal meningitis. It was popularly supposed that this disease was imported by the troops who came from Canada. There has, however, been nothing at all like an epidemic, and the disease has certainly not spread among the civil population. Having, however, once had the suspicion aroused the medical practitioners have performed a large number of lumbar punctures, which otherwise would not have been done, and all sorts of cases with indefinite physical signs and a temperature have been subjected to this operation.